COMPUTERWORLD

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In disk-array

Defections, late product force IBM reliance on StorageTek

By Craig Stedman
and Michael Goldberg

A stunning decision by IBM to accept emergency mainframe disk assistance from rival Storage Technology Corp. caught many customers off guard last week.

But with IBM's market share dwindling and its next-generation storage architecture nearly two years behind schedule, users agreed that the computer giant had to do something to stem a continuing tide of defections.

Interviews last week with a dozen mainframe users indicated that the deal for IBM to take over the marketing of StorageTek's Iceberg and Kodiak arrays as of July 1 should strengthen IBM's hand, even though its transition from past market dominance to codependence is embarrassing.

"I still have a lot of respect for what IBM can do" in developing storage products, said Dale Perry, director of technology architectures at Bell Sygma, Inc., the Toronto-based information systems and outsourcing arm of Bell Canada, Inc. "They just haven't done it lately."

Part of the problem is that IBM's Ramac arrays aren't up to the challenge, users said.

"Ramac doesn't measure up to more state-of-the-art products," said Joel Van Dyke, manager of hardware planning at Chrysler Corp. in Centerline, Mich. He said Chrysler stores about 9T bytes of data on Ramacs, but it switched allegiances this year and now

In disk-array, *page 131*

Three gets you one
IBM's Ramac disk array compared with StorageTek's products

	Ramac	Iceberg	Kodiak
Operating mode	RAID Level 5	RAID Level 6+	RAID Level 5
Base disk storage	11.35G bytes	45G bytes	46G bytes
Disk capacity	180G bytes	720G bytes	1.4T bytes
Maximum cache	2G bytes	4.6G bytes	4G bytes
Escon I/O channels	4 to 16*	4 to 16	4 to 16

*Through external 3990 Model 6 storage controller

NT 4.0 crash warning: Certify device drivers

By Laura DiDio

Microsoft Corp.'s Windows NT 4.0 Beta 2 release dramatically improves speed and performance over Windows NT 3.51 — especially for high-end graphics applications and printing functions.

But the potential "gotcha" in this release is that users risk workstation and server crashes if they install device drivers that aren't on Microsoft's hardware compatibility list, according to users, systems integra-

NT 4.0, *page 131*

NASA's J. Briscoe Stephens *says the benefits of the release outweigh potential problems*

SAP unlinks R/3 apps; integration takes hit

By Julia King
VIENNA

SAP AG has lost all religion.

The $1.8 billion client/server software giant is splitting its R/3 enterprise system — famous for its tight integration — into separate products.

Client/server

In another unprecedented move, SAP is extending development of new R/3 Internet applications be-

yond its proprietary ABAP/4 programming language. The company also announced a set of 25 Internet programs as part of R/3 Version 3.1.

All three moves will give users greater flexibility and will speed the R/3 implementation process, company officials said. SAP made the announcements last week at its European user conference here.

"Customers will not be forced to

SAP, *page 16*

Honey, I shrunk the revenue; IRS can't account for billions

By Gary H. Anthes
WASHINGTON

The Internal Revenue Service just flunked a government audit.

In fact, the General Accounting Office said IRS accounting systems are so flawed, auditors were unable to verify balances that total tens of billions of dollars and stretch back four years.
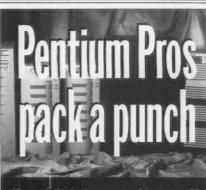
Other problems dug up by auditors included multibillion-dollar discrepancies, at least one $10 million write-off and outdated systems that are all but unauditable.

No contest
The IRS didn't dispute the GAO's findings, which were presented at a recent Senate hearing, and it offered no detailed explanation for them.

"It is disturbing to hear the IRS has not passed its financial audit," said Anthony Musick, the IRS' chief financial officer. "But that does not mean that the money the IRS is sup-

IRS, *page 16*

Pentium Pros pack a punch

After years of trying to overpower minicomputers, PC servers finally are knocking heads with those proprietary midrange systems. We tested the latest Pentium Pro-based servers, and they held their own against popular minis. Hewlett-Packard's newest server edged out its peers. BUYER'S GUIDE, page 93

Newspaper

This week in

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■ **Surfer's paradise**
Tech sites take you to the best of IS on the Web, and Hot spots link you to sites on the edge.
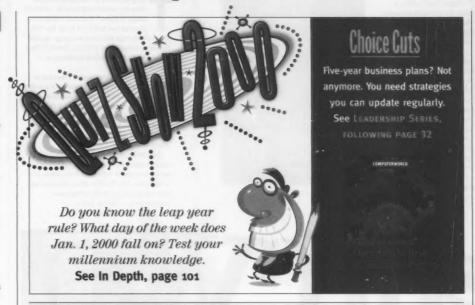
■ **Communications Decency Act**
Join Paul Gillin's thread on the impact of the CDA. Also, take our QuickPoll on the subject.

■ **Bad rap?**
Does management look down on IS? Consultant DuWayne Peterson leads this forum.

www.computerworld.com

Do you know the leap year rule? What day of the week does Jan. 1, 2000 fall on? Test your millennium knowledge.
See In Depth, page 101

Choice Cuts

Five-year business plans? Not anymore. You need strategies you can update regularly.
See LEADERSHIP SERIES, FOLLOWING PAGE 32

COMPUTERWORLD

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Twilight Man Society

Encore Media's Starz movie channel has created The Twilight Man Society, a Web site (twilightman.com) that focuses on the issues of harassment and invasion of privacy via computer technology. The site was developed in conjunction with the release of a cable TV movie *The Twilight Man*, which involves a mysterious man who harasses a professor by altering his medical records. The site has a few links to privacy resources, but it doesn't have links to heavy-hitter sites such as the Electronic Privacy Information Center (www.epic.org) and the Electronic Frontier Foundation (www.eff.org).

alt.cw

Government watchdog

The state of Nebraska plans to allot 2 cents of the 34 cents per pack it collects in cigarette taxes to help pay to fix the year 2000 problem in state computer systems, the *Omaha World-Herald* reported. The cigarette tax revenue would cover about $11 million of the $30 million date-conversion project.

Twenty-four U.S. agencies are scrambling to meet an Aug. 8 legislative deadline to establish the position of chief information officer, *Washington Technology* reported. The job pays $115,700 a year.

Lt. Tripler, the "Doonesbury" comic strip's morale officer for U.S. troops in Bosnia, can effortlessly send E-mail from Bosnia to the States. But *Federal Computer Week* reported that, because of a major technical glitch, real E-mail from U.S. soldiers in Bosnia is more likely to go into "a black hole" than to a loved one back home.

CompuServe thought it had a great, civic-minded idea to offer election candidates free access to CompuServe and the Internet to encourage on-line chats with the electorate. But the Federal Election Commission ruled that the free membership would be the equivalent of an in-kind corporate donation to candidates and is thus forbidden under current law.

Local governments that need an ordinance on barking dogs or graffiti don't need to reinvent the wheel, *Government Technology* reported. They can visit Municipal Code's Web site at www.municode.com and copy well-vetted ordinances from other municipalities.

South Korea warned its citizens not to contact North Koreans via the Internet, Reuters reported. South Koreans who access Web sites in North Korea will be punished under the National Security Law, which bars unauthorized contact with North Korea, prosecutors said.

■ Send contributions of offbeat news, lists and anecdotes to mbetts@cw.com.

Digital Frontiers

The good news is that many corporations are scrambling to write "Internet usage policies" that cover what employees can and can't do on the 'net. The policies typically have warnings against misusing copyrighted material, downloading pornography and sending harassing or libelous messages.

The bad news is that almost three out of five corporations still don't have such a policy. The survey, which had 119 respondents, was conducted by Gordon & Glickson, a computer law firm based in Chicago. The survey also found 62% don't have restrictions on downloading data, which increases the risk of virus infections.

Companies worried about the legal risks of cyberspace can also check out liability insurance coverage from Poulton Associates, Inc. in Salt Lake City. The firm offers information and rate quotes on its Web site: www.poulton.com. — *Mitch Betts*

Computer animators can use the CyberGlove from Virtual Technologies in Palo Alto, Calif., to make real-looking hand motions on screen. The glove has 18 sensors stitched into stretch fabric to determine how the fingers bend. The signals are sent by serial cable to a PC running the vendor's VirtualHand software. The gloves shown above have the CyberTouch "tactile feedback" option, which has small stimulators programmed to make users feel as though they are really touching the virtual object.

Mobil gas stations across the U.S. are rolling out the Friendly Serve program, which features old-fashioned service from attendants — even at self-serve pumps — and quicker transactions. Joe Minai, retail automation manager at Mobil headquarters in Fairfax, Va., said simplified keypads on the pay-at-the-pump terminals, faster processors and software changes will reduce point-of-sale transaction times by 30 seconds.

News shorts

MVS to support SAP R/3

IBM and **SAP AG** are targeting the week of Aug. 26 to announce MVS database support for R/3, said Hasso Plattner, vice chairman at SAP, in an interview with *Computerworld* last week.

The move will let SAP's mainframe R/2 customers retain mainframe-like data management and systems administration but move to client/server systems. Plattner said 60% of SAP's 1,800 R/2 users run MVS. They are mostly in the insurance and banking industries. He said SAP won't formally announce MVS support until it is within six months of shipping to customers. But he expects that announcement will be made at SAP's U.S. user group meeting in Philadelphia, Aug. 26-29.

Speedier Web browser

America Online, Inc. last week announced a new version of its client software that includes a new World Wide Web browser built for speed.

The new America Online client for Windows users is due this month. America Online officials said the built-in Web browser supports throughput speeds that are 30% faster than **Netscape Communications Corp.'s** Navigator or **Microsoft Corp.'s** Internet Explorer on a conventional dial-up Internet service. That's a big change for America Online, whose users complain its Web browser is creakingly slow.

The online service is swimming against the tide. Its three biggest competitors have begun to move their proprietary services to the Web, but America Online is sticking with its proprietary service.

David Gang, America Online's vice president of marketing in Vienna, Va., said proprietary software offers ease of installation and fast throughput that the Web still can't match. America Online users can still access the Web from America Online's client software, he said.

"There is no benefit to the consumer in going [directly] on the Web," Gang said. "It's a ludicrous concept. The best thing that ever happened to America Online was everybody else going on the Web. They're all focused on standards; they're not focusing on the customer experience."

Speaking of AOL . . .

America Online has signed an agreement to integrate and distribute **Macromedia, Inc.**'s Shockwave to subscribers. This follows Macromedia's announced partnership last week with Microsoft to integrate Shockwave with Microsoft's ActiveX technologies and Internet Explorer 3.0. Macromedia signed similar deals with **Netscape** and **Apple Computer, Inc.** earlier this year.

Sybase pins revival on becoming Internet player

By Dan Richman
WALTHAM, MASS.

Sybase, Inc. has hitched its comeback wagon to the Internet, hoping to recast itself as a preferred supplier of business technology for the World Wide Web.

At a strategy briefing here last week, Mitchell Kertzman, executive vice president of sales and marketing, said Sybase could repeat on the 'net the kind of runaway success that Powersoft Corp. had with Power-Builder in client/server development.

Sybase customers said they certainly would like to see that happen for their embattled database vendor, which has struggled through various financial, organizational and product difficulties in the past year.

"From products we have in-house, I know Sybase is serious about the Internet," said Bill Niemi, a chairperson of the International Sybase Users' Group. "I applaud the steps they're taking to let people know about themselves."

As it gears up for its Internet push, the company will continue to expand its middleware, development tools and relational database management systems offerings, Kertzman said. The company's marketing message is being recast to appeal to a broader business audience. Sybase in the past has focused mainly on information systems staffers and database technicians.

Database technology

"When technical people do an evaluation, Sybase always gets the nod," said James M. Echter, national sales manager at Information View, a Sybase development partner in Rochester, N.Y. "But now I'm seeing Sybase approaching top execs with teams of salespeople with some background in the industry they're dealing with. I've never seen that before."

An essential ingredient in Sybase's Internet effort will be PowerBuilder 5.0, which started to ship last week.

In its latest version, this development environment gained the ability to create application servers. These servers accept requests for data from Internet browsers, access databases and then return data to a browser. That data may appear in a Hypertext Markup Language format or as a PowerBuilder data window or application.

This means every application created with PowerBuilder during the five years it has been available can be converted to an Internet application by migrating it to Version 5.0.

Developers are expected to applaud this capability because it would reduce the burden of converting old applications from client/server to the Internet and enable the creation of new applications that run interchangeably on networks and browsers.

Most analysts and users said the strategy briefing buoyed their hopes for Sybase.

'net forces laud ruling

Court throws out online Decency Act

By Gary H. Anthes

In a resounding repudiation of Internet regulation, a federal court last week ruled that a new law that seeks to block online access to indecent material is an unconstitutional violation of free speech.

The action removes a cloud of uncertainty that had been hanging over Internet service providers and information systems managers fearful the law might snare them unawares.

Matthew Cutler, president of Webmaster's Guild, Inc. in Cambridge, Mass., said the ruling is a victory for IS managers who, under the law, could have been prosecuted for content on their Web sites even if the material was put there by someone else.

Cutler said the law had a chilling effect on the guild's 1,500 members, many of whom removed things from their Web sites after the law was passed. "There is content out there that in today's politically correct environment could be seen as objectionable, while other people perceive it as perfectly OK," he said.

A three-judge panel in Philadelphia issued an injunction against enforcement of the Exon-Coates Communications Decency Act of 1996, which criminalized the distribution or display of indecent material accessible by children on the Internet.

"This is a major victory for the Internet and a major victory for free speech," said Jerry Berman,

executive director of the Center for Democracy and Technology in Washington.

The lifting of the legal cloud was hailed by major online service providers as well. "The ruling removes a great deal of uncertainty and will allow us to move much more aggressively in the marketplace," said William Burrington, director of law and public policy at America Online, Inc.

While the ruling dealt most directly with free speech rights, legal experts said it will serve as a

landmark to guide Congress and the courts on other issues, such as privacy, libel and copyrights in cyberspace.

"This opinion will be required reading from now on for anyone who wants to understand the In-

Excerpts from the court decision on the Communications Decency Act follows. Full text of the decision can be found at www.cdt.org

- "As the most participatory form of mass speech yet developed, the Internet deserves the highest protection from government intrusion."

- "Any content-based regulation of the Internet, no matter how benign the purpose, could burn the global village to roast the pig."

- "Just as the strength of the Internet is chaos, so the strength of our liberty depends upon the chaos and cacophony of the unfettered speech the First Amendment protects."

ternet and how it works," said Bruce Ennis Jr., a Washington attorney who led the opposition to the law.

The government has 20 days in which to appeal the ruling to the Supreme Court. Ennis predicted a win on appeal because the lower court meticulously compiled more than 100 pages of "findings of fact" about the Internet and how it works.

The Supreme Court would be unlikely to challenge that foundation, Ennis predicted.

Concert service steps up the beat

By Kim Girard

Concert, the global telecommunications carrier run jointly by BT and MCI Communications Corp., will soon roll out a high-speed ATM backbone network for corporate Internet users who need guaranteed service performance.

Concert InternetPlus service, scheduled to debut in October, will let multinational businesses use a global network for groupware, electronic mail and electronic commerce.

For Lenny Kutorsky, chief information officer at Internet Trade Line, Inc., a New York-based international trade network, the new service "means a great deal."

"We're in 11 countries and expect to be in 20 countries by the end of the year," Kutorsky said. "Internet access is a problem for

Concert offers its customers:

- **High-speed** dedicated access of up to 45M bit/sec. to the Concert Internet network

- **The option** to establish intranets for enterprise messaging, including E-mail, phone mail, fax and document sharing among employees

- **Dedicated** and dial-up access from more than 1,200 locations in 70 countries

our customers overseas, especially in Europe. For them to fully utilize our services, they need industrial-strength service."

Traffic on the private network is expected to move faster than it does on the congested, public Internet, MCI officials said.

The service will provide dial-up and dedicated access to the core network, which will have an Asynchronous Transfer Mode (ATM) backbone. It also allows companies to establish global intranets for E-mail, voice mail, fax and document sharing.

The Concert strategy will bring multinational Internet customers onto their own private toll road. That way, more money can be made and service can be guaran-

teed, said Tom L. Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J. In the future, providers increasingly "are going to have to distinguish between easy, sleazy consumer access and business access," Nolle said.

Sprint Corp. last year took a step in this direction through its partnership with Deutsche Telekom and France Telecom and now has hubs in 30 countries.

Single network

InternetPlus differs from global services offered by BBN Corp., UUnet Technologies, Inc. and others because it is managed by one entity from end-to-end on one network. Other global services require linkages among multiple In-

ternet service providers.

But MCI's contention that this service will reduce congestion on the public Internet is far-fetched, said Eric Paulik, a research analyst at Gartner Group, Inc. in Stamford, Conn.

"Yeah, you could have less congestion, but that doesn't take into consideration the growth and the number of people getting on the Internet," he said. "What will help the congestion problem is more agreements between the [Internet service providers]."

Concert InternetPlus will be connected by eight new regional superhubs in Australia, Germany, the Netherlands, Japan, the U.K. and the U.S.

Pricing for the new offering has yet to be announced.

& Online services are Web-bound. See page 73.

Microsoft builds Web into OS

By Mitch Wagner and Kim S. Nash
SAN JOSE, CALIF.

Microsoft Corp. last week added more meat to its PC-centric plan to build World Wide Web functions into future versions of its Windows operating systems, bucking a trend to separate the 'net from the operating system.

The strategy includes adding Web-style navigation methods to Microsoft's Office applications suite; adding a Web server, search engine and development tools to Windows NT; and merging the Windows desktop and Web browser.

The plan, outlined at the company's Intranet Strategy Day here last week, won support from some users and analysts in part because corporate Web applications can be managed with utilities already in NT, they said (see related story below right).

Blurring lines between Web products and Windows NT "is a great idea," said Chip Wickenden, manager of electronic commerce at Barnett Banks, Inc. in Jacksonville, Fla.

"They hit IS managers where they live," said Rob Enderle, an analyst at Giga Information Group in Santa Clara, Calif. "They showed IS managers how they can be heroes in their organization." Microsoft's strategy will enable information systems managers to cut costs and improve employee productivity, he explained.

Microsoft's Internet strategy differs from those of operating systems rivals such as IBM, Novell, Inc. and Sun Microsystems, Inc. They see Web functionality and system software as separate animals rather than a hybrid.

Microsoft and Internet rival Netscape Communications Corp. also differ in their approaches to intranet, or internal Web, applications.

Different approach

While Netscape wants to coax IS shops to build often entirely new Web applications, Microsoft contends that adding Web concepts to existing software is smarter.

Some users agreed.

"What's important is to be able to use the Internet as a front end to applications like Word and Excel and Access, rather than rely on having a lot of different applications for access," said Anthony Pizi, vice president of advanced office systems and technology at Merrill, Lynch & Co. in Princeton, N.J.

Microsoft outlined a strategy last week in which all that data will be accessible using a Web browser. Internet functions will be written in to Windows, Windows NT and other Microsoft packages.

Microsoft also trotted out some product specifics. For example, a new search engine, code-named Tripoli, will be built in to Windows NT 4.0. FrontPage, comprising Web development tools inherited in the January buyout of Vermeer Technologies, Inc., will also be folded into NT 4.0.

The following products were also demonstrated at the conference:

● Internet Explorer 4.0, a Web browser merged with a new version of Microsoft's 32-bit Windows user interface that lets application icons and Web documents sit side by side. It is due out by year's end.

● Viper, a server designed to let users build and run large client/server applications by using the ActiveX programming interface.

● A proxy server code-named Catapult that lets webmasters manage user-access privileges to Web applications.

Users hesitant to buy software electronically. See page 61.

180 degrees of separation

Microsoft and Netscape spout opposing Internet philosophies

Web capability	Microsoft	Netscape
Browsing	Part of the basic PC user interface	Separate PC application
Building	Development tools added to operating system, and Web features added to existing tools	Some tools built in to special, more costly version of browser
Serving	Function built in to Windows NT	Separate package for multiple platforms

Netscape does intranets

With no apologies to recently minted author Bill Gates, Netscape outlined "The Road Ahead" last week.

Netscape's Web servers and browsers will be expanded and partly rewritten to appeal to corporate IS groups that build intranet applications, the Mountain View, Calif.-based vendor said.

For example, Orion, the code name for the next version of Netscape's SuiteSpot set of Web servers, will give Netscape the same electronic-mail and groupware capabilities as Notes and other more established products.

Galileo, meanwhile, refers to the next release of the Navigator browser. Due out by year's end, it will allow users to encrypt E-mail and support Lightweight Directory Access Protocol, a subset of X.500 directory services, among other new features.

— *Kim S. Nash*

NT directory service finally unveiled

Microsoft ended months of suspense last week and demonstrated an enterprisewide directory service that will be included in Cairo, the next generation of Windows NT.

The demonstration took place at last week's Intranet Strategy Day in San Jose, Calif. Sources close to Microsoft, who requested anonymity, said the company will formally preview the Cairo directory this fall and begin beta testing early next year. Cairo is expected to ship in the second half of next year.

The Cairo enterprise directory is the missing piece of Microsoft's network operating system strategy. It is needed to make it easy for administrators to centrally locate and manage geographically dispersed networks and objects, said Bob Sakakeeny, an analyst at consultancy Aberdeen Group, Inc. in Boston.

The directory will provide users with an extensive, hierarchical and graphical picture of every user and device on the network. It is similar to rival Novell's Directory Services.

Administrators will be able to do customized delegation of responsibilities, such as the ability to manage printers, peripherals or files on particular file servers. They will also be able to prune and merge users and objects into different branches on the tree or different areas of the network. — *Laura DiDio*

Office 97 gains new Outlook on information sharing

By Lisa Picarille

Microsoft Office 97, due at year's end, will be packed with World Wide Web-related document management features and a desktop information management application named Outlook.

The company last week outlined plans to exploit the Web through the company's best-selling Office suite of products.

As part of the major Office upgrade, Microsoft said it will add Outlook, a superset of Schedule+ that previously had been dropped from the suite.

Outlook was designed as an internal messaging and collaboration system that lets Office users share electronic mail, schedules, tasks, contacts and files. It also has been integrated with Microsoft Exchange, a groupware product that competes with Notes, to let Office users share information with non-Office users on Exchange servers.

"We've been waiting for this kind of product for a while," said John Tredennick, chief information officer and partner at law firm Holland & Hart in Denver. Holland & Hart switched from WordPerfect Office to Microsoft Office.

"WordPerfect for DOS used to have something with similar capabilities but very rudimentary. When we made the switch to Office, a lot of us were wanting something to share names, contacts, etc. So we wrote it ourselves using Visual Basic. It would be easier on us if those capabilities were integrated ... into Office."
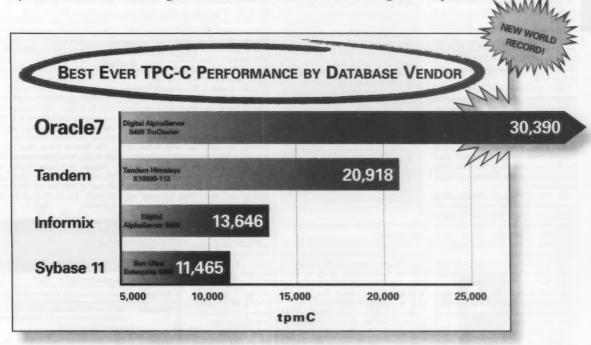
Some industry watchers questioned whether the Web and collaborative features are enough to get users to upgrade to Office 97.

But one user, who requested anonymity, said Office 97 was "extremely slick," and users will be "totally happy campers" about the Web functionality.

Limits of the 'net

Vendors alter tools to facilitate app development

By Frank Hayes

Corporate application developers are finding that the World Wide Web isn't quite ready for prime time.

As developers work to build the next generation of client/server applications on the Web, the limitations of development tools and the Internet itself are getting in the way.

"The tools will have to get to a certain level before most people will say, 'I can use this,' " said Paul Mundell, a decision-support specialist at Warner Brothers, Inc., a division of Time Warner Entertainment Co. in New York.

"The bottleneck now is the tools," agreed Michael Brando, an engineering manager at Perkin-Elmer Corp. in San Jose, Calif. "We can't get them from the vendors soon enough."

Tool vendors, including Microsoft Corp., Oracle Corp., Powersoft Corp., Centura Software Corp., are retrofitting their visual development systems to let users build Web applications and conventional client/server software.

The new development systems, which are scheduled to arrive within months, will let any user with a Web browser access client/server applications. But some more adventurous information systems shops are plowing ahead — and that can turn up unexpected problems.

"When you start Web-based development, a whole set of complexities comes into play that don't seem obvious until you really begin to do it," said Alan F. Nugent, chief technology officer at the global strategy and advanced technology group of Xerox Corp. in Rochester, N.Y.

Those complexities include making sure each user has a private session and security, reliability and performance issues. Developers are also concerned about Web

Get ready to Mambo

Open Environment Corp. in Boston this week will begin shipping a Web connection for its Entera application middleware.

The Mambo tool set, which will let developers build Web applications that link to mainframe and relational databases, will cost $2,495 per developer. It runs on versions of Unix from IBM, Hewlett-Packard Co. and Sun Microsystems, Inc., with a version for Windows NT slated to ship in July.

And last week Centura Software Corp. said it will add Web support to its high-end Centura Developer tool set. Centura Web Developer, which will ship in the third quarter, will let Windows 95- and NT-based developers use the Web to deploy applications originally designed for Windows-based PCs. Pricing wasn't announced. — *Frank Hayes*

browsers, which lack standards for displaying documents.

"We're eager to use plug-ins and add-ons, but we're cutting our own throats," said Rick Brennan, manager of Web services at National Semiconductor Corp. in Santa Clara, Calif. "We really need a baseline so I don't have to worry about what operating system or browser or plug-in a user has."

Also of concern is how slowly screens appear across the ever-more-crowded Internet.

WebMate links Web pages, databases. See page 76.

Banyan's BeyondMail delivers improved message management

By Tim Ouellette

Banyan Systems, Inc. is helping users cope with electronic-mail overload and beefing up its Internet mail software.

The company last week announced that BeyondMail 3.0 Internet Edition will automatically download certain messages based on user criteria and filter messages from discussion lists.

For example, messages from a high-volume discussion group on a new project can be automatically routed to a special folder. Or, E-mail asking for certain approvals can be automatically sent to the appropriate manager. The Internet Edition can also run Microsoft Corp. ActiveX-based applets based on user-defined requirements.

Internet E-mail

Trying to get in the running

Recently, Internet E-mail vendors have attempted to boost the security, administration and management features of their products to help compete with the more robust offerings from proprietary messaging products such as CC:Mail, Exchange and GroupWise.

With the improved rules features in BeyondMail, Banyan officials said they hope to let users create what they call "business on mail" applications. These applications combine rules-based filtering with electronic forms and require minimal programming.

For example, users can set up a time-keeping system that lets them fill out time

sheets in a mail message. The system automatically routes the sheets to managers for approval and then to other departments for payment.

"They have made the scripting of rules-filtering more procedural, giving us more functionality," said Lonnie Clardy, an associate consultant at The Network Technology Group in San Jose, Calif.

Because all BeyondMail messages are essentially forms, users have more flexibility in sorting and organizing their mail. Users can create forms within the program — where before this required a separate module — so it will be easier to exploit the product's features, Clardy added.

Several standard applets will be included with the product. Mail Minders, which are automated helpers driven by dialog boxes, are also included to help users quickly manage folders and their in-box.

The Internet E-mail client will ship this fall. Pricing hasn't been announced.

Support for Internet security protocols, Microsoft's Messaging Application Programming Interface and the new Internet Message Access Protocol is slated for year's end.

Rack 'em up

BeyondMail 3.0 Internet Edition will have a four-tiered directory structure:

TIER	FUNCTION
Personal	Private directories.
Workgroup	A shared directory for a limited number of users.
Enterprise	Based on StreetTalk's services for organizational directory. Users can use any Lightweight Directory Access Protocol server.
Global	Access Switchboard, Banyan's Web-based white pages at www.switchboard.com.

News Shorts

Cabletron widens Spectrum by hooking up with BMC

This week **Cabletron Systems, Inc.** in Rochester, N.H., will reveal a significant boost to the systems and application capability of its Spectrum network management platforms. **BMC Software, Inc.** is the latest in a series of vendors that are partnering with Cabletron to integrate their tools with Spectrum and ease end-to-end management.

Gigabit Ethernet group grows

The fledgling Gigabit Ethernet Alliance, which was formed last month to develop Ethernet products that operate at 1G bit/sec., picked up steam last week with the addition of 28 members, including **Cabletron**, **Digital Equipment Corp.** and **Xylan Corp.** The first Gigabit Ethernet switch, from **NBase Communications, Inc.**, is due in August.

PC: Heal thyself with suite

A PC's ability to "repair itself" will take a leap forward this week when **SystemSoft Corp.** in Cambridge, Mass., **Intel Corp.**

and **Digital** introduce a suite of software products that identify, diagnose and resolve common PC usage and configuration problems at a user's PC. The product, SystemWizard, will be bundled with new PCs, peripherals and software applications beginning later this year.

SCO Comet landing delayed

With its focus more on UnixWare these days, **SCO, Inc.** has postponed plans to revamp its low-end OpenServer operating system. Some initial pieces of a promised new version, code-named Comet, were introduced last week as an add-on to Open-

Server Release 5. But key features such as built-in support for Sun Microsystems, Inc.'s Java programming language and increased memory addressing capabilities will now debut in a series of updates that extend out to year's end, SCO said.

Sabre Group names first CIO

The Sabre Group has appointed Terrell B. Jones as the first chief information officer of the Fort Worth, Texas-based transportation services firm. Jones, who was most recently president of Sabre Computer Services, will continue as president of Sabre Interactive, the Sabre Group business unit responsible for consumer-direct electronic distribution.

NetManage and the Jets

JetMail and ZMail users can relax. Their Internet electronic-mail systems will continue to be supported by Cupertino,

Calif.-based **NetManage, Inc.**, which bought ZMail earlier this month. This will occur even though NetManage will develop a new E-mail system based on features in both products.

Microsoft, TI repository

Microsoft Corp. and **Texas Instruments Software** in Plano, Texas, have finished design work on their long-awaited repository for building applications using Microsoft's OLE components. The repository is due to ship by year's end.

SHORT TAKE Pacific Bell Network Integration, a subsidiary of the **Pacific Telesis Group** in San Francisco, has allied with **IBM's** Integrated Systems Solutions Corp. to offer monitoring and maintenance of PC networks.... **Bell Atlantic Nynex Mobile** in Bedminster, N.J., has reduced usage charges for its Cellular Digital Packet Data usage plans by more than 70%. The rates will range from 4 to 15 cents per kilobyte.

Oracle® Universal Server®
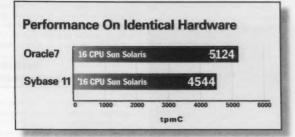
Faster

Performance On Identical Hardware

		tpmC
Oracle7	16 CPU Sun Solaris	5124
Sybase 11	16 CPU Sun Solaris	4544

0 1000 2000 3000 4000 5000 6000
tpmC

Cheaper

Price/Performance On Identical Hardware

		DOLLAR PER tpmC
Oracle7	16 CPU Sun Solaris	$323
Sybase 11	16 CPU Sun Solaris	$396

0 100 200 300 400
DOLLAR PER tpmC

Better

Oracle7	Sybase 11
✓ Universal Server: Tables, Text, Image, Audio, Video	"Sybase, which has yet to discuss its plans for such a server, is viewed as lagging in this area." — **Network World**
✓ Parallel Server: Query, Index & Recovery	"Sybase...has scalability problems with its System 11 release." — **Information Week**
✓ Concurrent Server: Row-Level Locking	"Sybase System 11...does not support row-level locking." — **Information Week**

The Market Has Spoken

Oracle Software Revenue Up 41%

Software Growth: 50% / 25% / 0%
Q1 44% Q2 52% Q3 25% Q4 41%

Sybase Software Revenue Down 3%

Software Growth: 50% / 25% / 0%
Q1 17% Q2 16% Q3 -6% Q4 -3%

Revenue percentages based on respective companies' comparable consecutive quarters

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HP outlines plan to close OpenView gaps

By Patrick Dryden

Users of OpenView management software who gather next week in St. Louis for their annual conference will get hands-on help with current problems and a heads-up briefing on missing pieces from Hewlett-Packard Co.

The vendor-independent OpenView Forum, based in San Francisco, expects more than 1,000 attendees at the weeklong exposition and series of briefings, tutorials and demonstrations.

One hot topic will be the continued evolution of OpenView from primarily a network management platform into a full framework that also maintains workgroups, systems and applications.

HP will push OpenView IT/Operations, introduced earlier this year for a summer rollout. That package combines the market-leading Network Node Manager with tools for systems management, software distribution and other functions found previously in OpenView Operations-Center.

With such integrated suites, operators can see both sides of a problem that hits a client/server network. When a red alert warns of service interruption, they can investigate a database, its server and all LAN connections, for example, from a single console.

Systems management

"Like many corporations, we're trying to combine network and systems management through both tools and organizational changes. We want one group of engineers responsible for all parts of our environment, to facilitate the centralization of management," said Sandy Potter, telecommunications engineer at Air Products & Chemicals, Inc. in Allentown, Pa., and an OpenView Forum officer.

But for most attendees, OpenView still means just Network Node Manager and tools that build on its discovery, mapping and alarm handling. Therefore, many sessions will focus on upgrading to and taking advantage of the distributed architecture in Version 4.1, released in April.

Support needed

Migration and tool support are crucial for attendees from Chevron Information Technology Co. in San Ramon, Calif.

"We suffer performance problems now with our database of 60,000 managed objects, way past what Network Node Manager supports," said T. X. Ho, senior communications engineer at Chevron. "That limits our ability to manage, so we need 4.1 to improve performance and distribute management among remote sites."

Ho said Chevron network managers plan to test Network Node Manager 4.1 next month, but he added that he fears other vital tools won't work with the new version until October or later.

Seagate Enterprise Management Software, Inc. in Cupertino, Calif., will be among the HP partners demonstrating support.
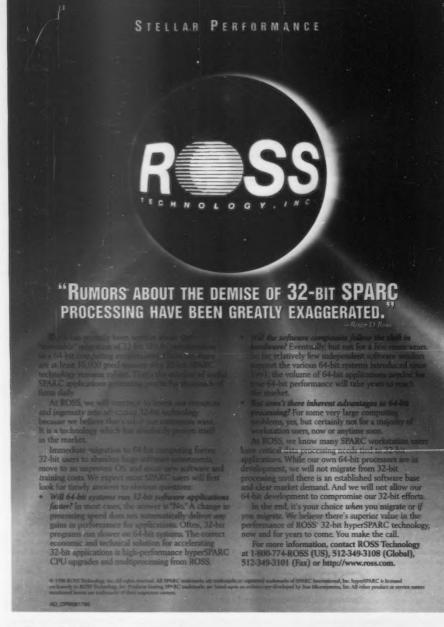
Seagate EMS officials said they will preview Version 2.6 of NerveCenter event-correlation software, which specifically supports Network Node Manager 4.1 and its distributed capabilities. NerveCenter 2.6 is scheduled to ship July 15.

Another sticking point is efficiency because small and overworked management staffs must wrangle with growing networks.

SNMP Research International, Inc. in Knoxville, Tenn., will help OpenView users automate management of far-flung network elements. SNMP Two-Star Security, developed with HP, secures functions of the Simple Network Management Protocol to streamline remote configuration of agents and collection stations.

The Web may serve as a management platform. See page 65.

Switching back to net manageability

New tools help managers monitor nets

By Patrick Dryden

New tools entering the market can help administrators and troubleshooters shed light on the black holes in their end-to-end network management caused by switches.

Options include application monitoring software to track performance through switched and routed networks, a handheld switch tester and inexpensive monitoring software tuned to specific switches and hubs.

Analysts say each new product is a welcome breakthrough. These unique tools can help users regain the network manageability they traded away in the rush to overhaul campus LANs with switches, they say.

In shared-media networks, managers can watch all the traffic that flows through one section. But ever-cheaper switches let them slice networks into smaller segments, which boosts performance but forsakes visibility.

Track record

"We need to track packets and errors through our Ethernet switches, not just depend on … the little green lights and little red lights that show basic port activity," said Fran Glasco, MIS director at AZO, Inc. in Memphis. "Bottom line, we just want to see what's eating up bandwidth."

Glasco is considering adding monitor software or holding out for newer switches with support for remote diagnostics.

To check AZO's switched segments, Glasco lugs a laptop to the switch, gets into terminal mode, samples ports one at a time and writes down statistics for analysis.

Switching also clouded the view of network connections at the National Weather Service in Silver Springs, Md.

Users there needed faster access to server-based simulations

and exchange of satellite image files. But network managers are "limited on information available through the switches," said computer specialist Jerry Kelly.

Managing switched networks should get less cumbersome with the release of several new tools, including the following:

- Compuware Corp. next week plans to ship Version 2.0 of EcoNet, graphical monitoring software that analyzes the response time of client/server applications.

"There's a very big need for their simplified application traffic analysis in switched networks," said Brian Burba, a management analyst at International Data Corp. in Framingham, Mass.

But Compuware supports only three switches from 3Com Corp. and Cisco Systems, Inc.

- At PC Expo this week, Fluke

Corp. will launch the SwitchWizard version of its Enterprise LANMeter, a portable tester for cables and internetworking gear.

The Fluke Networks division in Everett, Wash., offers SwitchWizard for $995 as an option or upgrade to Enterprise LANMeter, which starts at $8,495.

- 3DV Technology, Inc. last week introduced performance monitoring software at one-tenth the price of Remote Monitoring (Rmon) systems that have similar capabilities.

"This specific-vendor reporting approach lets 3DV provide helpful management information right out of the box, compared to Rmon systems that require a lot of work," Burba said.

Web may serve as a management platform. See page 65.

3Com cuts Ethernet switch price

Discounts could hasten deployment of desktop switches

By Bob Wallace

3Com Corp. is slashing prices in an effort to tighten its grip on the desktop Ethernet switch market.

The company has quietly given its distribution channels permission to discount its already low-cost LinkSwitch 1000 desktop Ethernet switch by up to 40%, sources said. And the company is prepping inexpensive Ethernet switching modules for its shared-media hub.

Shared-media hubs let many users share the capacity of a regular Ethernet LAN; Ethernet switches provide dedicated bandwidth for every port.

Can't say no

"They're making Ethernet switching irresistible to users with these discounts," said Tam Dell'Oro, president of The Dell'Oro Group, a research and consulting firm in Menlo Park, Calif. "This will accelerate the move from shared-media hubs to Ethernet switching."

Users agreed.

"This effort sounds like a winner to me since we're planning to roll out some high-bandwidth applications such as multimedia in the desktop and need the capacity of switched Ethernet to do it," said Maralyn Rosenblatt, vice president of client services for desktop technologies at Country-

3Com's Ethernet switching pricing		
PRICE PER PORT	**LIST PRICE**	**DISCOUNTED PRICE**
LinkSwitch 1000 (24 ports)	$199	$128
LinkSwitch 1000 (12 ports)	$331	$195
TOTAL SYSTEM PRICE		
LinkSwitch 1000 (24 ports)	$4,975	$3,072
LinkSwitch 1000 (12 ports)	$3,975	$2,340

MSH Ethernet switching pricing	
BEFORE	**WITH PLANNED MODULES**
$1,110 to $1,655 per port	Under $300 per port

Sources: The Dell'Oro Group, Menlo Park, Calif.; 3Com Corp., Santa Clara, Calif.

wide Insurance in Simi Valley, Calif. "A 40% discount makes it a lot easier for me to justify Ethernet switching to upper management."

Mike Green, director of technology at Williams-Sonoma, Inc. in San Francisco, said he finds the discounts alluring. "This would be the point where we could move from regular Ethernet in our warehouse to Ethernet switching. It makes sense since we have many clients trying to access one server."

3Com wouldn't confirm or deny the deep discounts, which undercut rivals Cisco Systems, Inc., Cabletron Systems, Inc. and Bay Networks, Inc. (see chart).

3Com accounted for 52% of all desktop switched Ethernet ports shipped in the first quarter this year, according to The Dell'Oro Group. Cisco shipped 26% of the ports in that same period.

The 3Com move could trigger a price war, but Dell'Oro said other vendors can't manufacture in the

volumes that 3Com has attained, and they don't have 3Com's broad distribution channels.

But not all users can afford to abandon their investment in shared-media hubs yet.

3Com has anticipated that; the company is quietly preparing Ethernet switching modules that can be used in the estimated 8,500 Multi-Service Hub (MSH) shared-media hubs in user networks today. They will enable the hub to support a mix of the two technologies.

The Ethernet switching modules cost less than $300 per port. The vendor previously offered an Ethernet switching module for the MSH, but it cost $1,110 to $1,665 per port. With the new modules, the MSH can be configured to support a maximum of 120 switched Ethernet ports.

3Com is also prepping two Fast Ethernet uplinks for the MSH that will let users link the hub to 100M bit/sec. backbone networks. Modules will ship Aug. 22.

Digital sales revamp speeds channels push

By Jaikumar Vijayan

Digital Equipment Corp. is doubling the number of corporate accounts that it will directly service to roughly 2,000.

The move highlights a new, elaborate — and somewhat confusing — three-tier market delivery plan designed to improve customer service, reduce cost of sales and alleviate channel conflict.

Digital's goal is to ease the flow of information between itself and its customers. Users contacted by *Computerworld* last week said it is too early to predict how the reorganization will affect them. But they said they welcomed the move.

Good move

"Moving to the indirect channel is probably a good thing. Third-party folks are ready to beat up each other on sales and service," said Ronald Freed, MIS manager at Hatfield Quality Meats, Inc. in Hatfield, Pa.

Toward this end, Digital last week said it will tie an increased direct presence in its customer base with a substantial boost in the role of its channel partners — such as dealers, value-added resellers and systems integrators [CW, June 10].

Under the three-tier plan detailed by company executives last week, Digital will continue to as-

sign several representatives to each of about 1,000 top-tier accounts that it will directly serve. But some of the accounts currently in this top tier could get replaced by other companies that Digital thinks will yield the most in long-term sales, said Chris Christiansen, an analyst at International Data Corp. in Framingham, Mass.

Customer service

The company also will add a second tier that comprises about 1,000 slightly smaller accounts, each of which now will be covered by a specifically assigned Digital sales representative.

The representatives will generate orders and keep customers informed about the latest product information.

Finally, Digital will soon start a telemarketing effort to keep in direct touch with smaller and mid-size third-tier customers with whom it has had little or no direct contact in the past.

In all cases, Digital will rely heavily on the indirect channel for actual order administration, order fulfillment, service and support.

"All this sounds good. In fact, the biggest change we have noticed over the past few years is not having someone from Digital drop by every two weeks and say, 'Hey, take a look at what's new,'" said Michael Felerski, systems network manager for Butler County, Ohio.

Notebooks lead tech parade at PC show

By Mindy Blodgett

Top notebook vendors will showcase new releases at this week's PC Expo in New York to give rising sales another shot in the arm.

According to International Data Corp. in Framingham, Mass., U.S. laptop shipments for the first quarter rose from 801,000 last year to 975,000 this year.

And analysts predict worldwide sales will grow 28% this year.

Market leader **Toshiba America Information Systems, Inc.** in Irvine, Calif., this week will announce several new notebooks.

These include the Satellite Pro 420 series, multimedia notebooks with 100-MHz processors that will start at $2,999, and an update to the Portege 650CT. The Portege 650CT weighs 4.8 pounds, has a 133-MHz chip and an 11.3-in. screen. It costs $4,499.

Texas Instruments, Inc. in Dallas will release a high-end notebook in the TravelMate 6000 series. The notebooks will have 120- and 133-MHz chips and 11.3- and 12.1-in. screens. Pricing will start at $4,199.

Olivetti Personal Computers USA, Inc. in Austin, Texas, this week enters the U.S. market with the Echos family.

The notebooks will have 100- and 133-MHz chips and screen sizes that range from 10.4 to 11.8 inches. They will cost between $2,499 and $4,999.

Indie releases

There are also some developments this week from the leading operating system vendors.

IBM, which is slated to ship its next release of OS/2 Warp — code-named Merlin — late this summer, will showcase the product. IBM also plans to announce new clustering capabilities for its OS/2 Warp Server network operating system.

Meanwhile, independent software developers for **Novell, Inc.**, including **Systron, Inc.**, will demonstrate the next release of NetWare 4.x — known internally as Green River.

Novell is working feverishly to put the finishing touches on Green River so the product can ship late this summer, which is about the same time Windows NT 4.0 is due to hit the streets, sources close to Novell told *Computerworld*.

New Pentium Pro-powered servers will be on display, some of which were recently announced and some that are previews of upcoming announcements.

AST Research, Inc. in Irvine, Calif., will ask attendees to try the firm's new Manhattan dual-processor Pentium Pro servers. Pricing will start at $7,500.

Dell Computer Corp. in Austin, Texas, will preview its new single-, dual- and quad-processor Pentium Pro servers that the firm plans to ship by year's end.

Several vendors will demonstrate network computing devices designed to attach directly to the Internet. Those vendors will include AST Research, **Wyse Technology, Inc.** in San Jose, Calif., and **JCC Corp.** in Japan.

Comdisco, Inc. will present a desktop asset management survey by **Survey Research Group**, which will reveal the average company savings by employing asset management on the average $60,000 cost of a networked PC over five years.

See *Computerworld*'s Web site for updates this week at www.computerworld.com.

Senior editors Laura DiDio, Kim Nash and Bob Francis contributed to this story.

Features of the Toshiba Portege 650CT

Processor: 133-MHz Pentium
Memory: 16M bytes, expandable to 80M bytes
Screen: 11.3-in. active-matrix color
Bus architecture: PCI system supporting external docking

Oracle sends a group message

By Tim Ouellette

This week, Oracle Corp. will become the latest vendor to dive in to the groupware pool when it unveils Oracle InterOffice, groupware based on the Oracle7 relational database.

And in a twist on the groupware theme, the Redwood Shores, Calif., firm also appears to be laying tracks to turn InterOffice into a full collaboration suite by adding word processing, spreadsheet, presentation graphics and electronic forms components into future versions of the product.

Analysts said the integration of productivity components into InterOffice is similar to the strategy behind Lotus Development Corp.'s Lotus Components for Notes. The focus is to provide a basic feature subset of traditional suite applications so users can embed an editable spreadsheet within a Notes document, for example, without launching a separate application.

Prompting change

It isn't clear whether Oracle will add links to existing full-featured productivity applications or develop its own smaller components.

With InterOffice's built-in support for client access from almost any platform, including Web browsers, analysts say Oracle's

InterOffice note		
How Oracle's new InterOffice groupware compares with Notes:		
	InterOffice	Notes
Application development	OCX controls expose various groupware services	Built-in LotusScript and extensions for Notes development
Client	Web browsers and standards-based client support	New Domino Notes server will allow access from Web browsers
Back end	Oracle7 database	Notes databases
User base	500,000 Oracle Office users	5 million users

initial splash could be a tidal wave that crashes on other players in the groupware market.

Lotus Development Corp., Microsoft Corp. and Novell, Inc. plan to open up their groupware products in a similar manner.

Oracle must overcome its late start, lack of reputation for delivering nondatabase products and a perception among non-Oracle users that the firm is just trying to sell more database licenses.

For example, even an Oracle database user, the IRS (see story, page 4), isn't convinced of Oracle as a groupware option to other Internet alternatives. "No, I wouldn't buy it — it's too late," said Thomas Bridges, a network manager at the IRS in Austin, Texas. "Oracle is not something you put on the desktop. They are best

used in the glasshouse."

But one user of Oracle's low-end workgroup effort — Oracle Office — is positive. Detroit Edison expects to benefit from the workgroup and Internet features available in InterOffice, said Donald Brett, chief information officer at the electric utility.

The firm's 5,000 users now run Office as their only electronic-mail system. "Had they not done this, we would have found ourselves in increasingly difficult times [with Office]," he said, referring to pressure to add better collaboration to the system.

In InterOffice, Oracle added collaboration capabilities, document management and a workflow component (due by year's end) to Office's group E-mail and scheduling features.

Users say Symantec has gotten its Act 3.0 together

By Stewart Deck

When Symantec Corp. unveils the new version of its top-selling contact management software — Act 3.0 for Windows 95 — later this summer, users will discover several long-awaited features.

One of the new features will let users work in their preferred word processor and merge letters and documents directly into Act 3.0. Louise Reilly Sacco, a marketing consultant in Needham, Mass., applauded the move. "This will save me [from] exporting individual files for mail merges. I like the sound of that a lot."

'Meaningful changes'

Analysts said it was a good move for Cupertino, Calif.-based Symantec to bypass Act 3.0's built-in word processor, described by some as only "functionally adequate."

Pricing for Act 3.0 is expected to remain close to the current price of $199, a company spokesperson said.

Act 3.0 splits the difference between a major revamp and modest product tweaking, said George Colombo, publisher of "Sales Automation Adviser," a newsletter in Winter Springs, Fla. "It's still the product that's easy for beginners to start using, but it has some meaningful changes."

The release spices up the report generator by adding subtotal results, statistics functions and sorting capabilities. Sacco said this will help her integrate reports and figures from disparate sources and save her the time of transporting them to other applications.

Act now

With new features of Symantec's Act 3.0, users will be able to do the following:

- Attach files to contacts
- Customize layouts and databases
- Find contacts based on Caller ID with telephony application programming interface support
- Share group calendars
- Manage projects and accounts

Even with the new bells and whistles, Sacco said she will still have to wait for Symantec to include in Act the tool that is at the top of her wish list — one that lets her combine data from different databases into a central scheduler. "I keep hoping they'll give me something so I don't have to go into each of my separate calendars to see what I have to do that day."

Claris buys open Web authoring tool

Product will merge into Home Page, run on Mac, Win 95 and Win NT boxes

By Lisa Picarille

Apple Computer, Inc.'s software arm now has Internet legs.

Apple subsidiary Claris Corp. last week entered the heated World Wide Web authoring race by purchasing a cross-platform Web page creation tool for an undisclosed sum from privately held San Andreas Systems in Los Altos, Calif.

The package, code-named Loma Prieta, will be transformed into Claris Home Page as part of Apple's plan to shift its focus to Internet products.

Claris Home Page, which runs on Mac OS, Windows 95 and Windows NT, targets individual users and webmasters.

A beta version of Claris Home Page is due later this month as a free download from Claris' Web site (www.claris.com).

Web authoring rivals

PROGRAM	PRICE
Claris Home Page	To be determined
Microsoft FrontPage 1.1	$149
Adobe PageMill 1.0	$99
DeltaPoint QuickSite	$99.95
SoftQuad HotMetal Pro 2.0	$195

The final version is slated to ship — on Windows and Mac OS — by the end of the summer. Pricing has yet to be determined.

Observers said Claris Home Page's availability on multiple platforms gives it broader appeal. Microsoft Corp.'s rival FrontPage is a Windows-only package. Adobe Systems, Inc.'s PageMill is available on the Macintosh, and a Windows version is in the works.

Switch-hitters
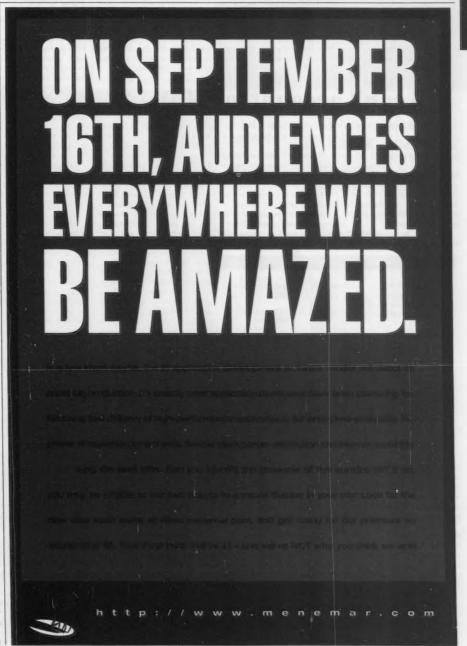
Claris in Santa Clara, Calif., plans to exploit that edge by making "competitive side-grade" offers to entice users to switch to Claris Home Page.

Daniel Dern, an independent Internet consultant in Newton, Mass., said users who create Web pages are "highly likely to switch products or even use multiple products for Web page creation." That's because Hypertext Markup Language (HTML) is a standard for creating Web pages, and the only user investment is the cost of the software.

One user said his organization uses PageMill to create Web pages but added that he was receptive to new products.

"I suspect it will be easy to switch from other competing products. And the availability of new features, especially if they cost less, encourages us to check out new products," said Victor Nazarian, computer systems director at Harbour Inn Medical, a hospital in Baltimore.

Beyond the basic Web page authoring features of rival products, Claris Home Page lets users view and edit HTML code, generate complex tables and frames, run Java applets and drag and drop prebuilt Web design items.

Claris also plans to beef up the integration among Claris Home Page and the company's popular ClarisWorks and FileMaker products, which have an estimated 10 million users.

The proposed integration would add an HTML module to ClarisWorks that would allow ClarisWorks files to be read directly into Claris Home Page.

& **Information Builders' Cactus** grows Web pages. See page 50.

IBM to offer DB2 text extender

By Dan Richman

Within less than a month, some users of IBM's DB2 database system will be able to manipulate text, video, audio and images.

IBM officials said they will package four "extenders" to DB2 in the Developers' Connection Cross-Platform Development Kit, which is set to ship by July 14. It will cost $495.

Extenders are IBM's term for software add-ons that expand the types of data DB2 can add, query, sort and otherwise manipulate.

The extenders will work with Version 2.0 of DB2 for AIX, OS/2 and Windows NT. A text extender for AIX has been shipping since January. Plans call for extenders to be created for all DB2 platforms, but no timetable has been disclosed, said Janet Perna, IBM's director of database technology.

One early user of the text extender to DB2 is Kathy Mesa, a publishing systems analyst at the *San Jose Mercury News* in San Jose, Calif. The paper uses a beta version of the software that lets users search through a database of classified ads on a World Wide Web site run by the paper and eight others. "Users say we have the best career-search service in the 'net, in large part because of our speed," she said.

IBM's scheme for dealing with these nontraditional data types, Perna said, is to provide an application programming interface for text, video, audio and images as well as for traditional data such as characters and numerals. That allows a single SQL statement within a database application to manipulate both types of data.

SAP unlinks R/3 apps

simultaneously update financials, human resources and logistics applications," said Hasso Plattner, vice chairman of SAP. Instead, users will be able to upgrade an individual package, such as financials, "without bothering the others," he said.

But the trade-off could be as much as a 20% decrease in the enterprisewide efficiencies that R/3's current application-to-application integration now offers, according to Peter Zencke, a member of SAP's executive board.

The individual applications, which run on separate databases, will be linked via SAP's application link enabling (ALE) messaging technology.

"We can still achieve good integration, but not 100% integration," Zencke said.

Pricing for the separate products will equal pricing for the integrated modules. That is about $4,000 per user for the SAP financials module, for example.

ALE also is at the heart of R/3 3.1, which features 25 new R/3 Internet applications and a Java-based graphical user interface. R/3 3.1 will be delivered to all R/3 3.0 users as a regular upgrade by year's end.

Each of SAP's new Internet programs — known as satellite applications — run on Windows NT-based servers separate from a user's core R/3 system.

Saving a bundle

Providing Internet access to R/3 will save millions of dollars annually at Sasol Ltd., a $4 billion petrochemical company in Senderwood, South Africa. Sasol now leases bandwidth from a third-party vendor to furnish its 24 business units worldwide with a dedicated network.

"The dedicated lines cost a fortune," said Dirk Struwig, manager of intercompany information services at Sasol.

Struwig said Internet access to R/3-based shipping information would allow Sasol to better manage and track a complex distribution process. This involves shipping goods by both pipeline and tanker to offshore storage facilities before distributing them to their final destinations.

> **SAP's R/3 Version 3.1 includes:**
> - 25 new SAP R/3 Internet programs
> - SAPGUI, a new R/3 user interface based on Java
> - A repository of 100-plus R/3 APIs for use by third-party developers
> - R/3 Internet Transaction Server based on Windows NT

SAP's offerings will include supply chain transactions, such as ordering goods, and intranet transactions, such as enabling employees to look up benefits information.

Virtually all enterprise vendors have announced Internet access to their software. But SAP "has gone further than anybody else in figuring out specific transactions," said Andrew Dailey, an analyst at Gartner Group, Inc. in Surrey, England.

Plattner said SAP will develop different pricing schemes for different types of users. Occasional R/3 users, such as managers, will pay less than full-time users. How SAP will track the number of users who access R/3 through the Internet hasn't been decided.

"If we cannot count [Internet] users, we will count transactions," Plattner said. "The price of R/3 on the Internet is not for free."

IRS can't account for billions

posed to be collecting or spending has simply disappeared."

But at least one senator sounded a call for financial oversight of the organization, which has perpetually been in hot water with Congress, most recently over difficulties in modernizing its tax systems [CW, April 1].

Sen. Ted Stevens (R-Alaska), chairman of the Senate Governmental Affairs Committee, said the IRS may require an "outside entity" to lead it out of its system woes. He cited as a model the financial control board now riding herd on the District of Columbia.

Problem areas

Gregory M. Holloway, director of government audits at the GAO, told the committee the GAO wasn't able to determine the reliability of the IRS' financial records. He ticked off the following compelling problem areas:

● 1994 revenue of $1.3 trillion, as recorded in the IRS' detailed taxpayer files, was $10.4 billion less than what was recorded in the ag-

gregate tax revenue figures maintained by the U.S. Department of the Treasury.

"The IRS did not know, and we could not determine, if the reported amounts were correct," Holloway said.

● The IRS accepts a tax return as an official record of taxpayer income when the return is filed. At the end of each year, the IRS begins matching those returns with taxpayers' earnings as reported by the Social Security Administration, a process that can take 2½ years. The delay adversely affects the IRS' ability to account for and collect delinquent taxes.

● GAO auditors said they couldn't "verify the validity" of $113 billion in total accounts receivable and $46 billion in collectible receivables in the IRS' 1995 books.

● The IRS last year hired a contractor to reconcile the differences between IRS and Treasury records back to 1992. Documentation on those differences before 1993 couldn't be located, and $10 million was written off as a result.

"These systems do not meet today's accounting standards for fi-

nancial management systems, and they do not provide an adequate transaction trail," said Valerie Lau, inspector general at the Treasury Department, in testimony before the committee.

In response to the litany of complaints, Musick outlined a series of measures, begun last year, to ensure more detailed tracking and reporting of revenue transactions. Such tracking wasn't required of federal agencies before passage of the Chief Financial Officers Act of 1990, he said.

Musick said the IRS has strengthened the documentation of revenue transaction flows, greatly increased the retention period for detailed records, integrated many administrative systems, replaced some paper flows with electronic communications and made other system improvements.

A report issued by the GAO earlier this month confirmed the IRS has taken many steps to improve its $8 billion tax systems modernization program. "However, many of these actions are still incomplete and do not respond fully to any of our recommendations," said Gene L. Dodaro, assistant comptroller general.

At an IRS oversight hearing in March, Rep. Jim Lightfoot (R-Iowa) threatened to pull the plug on the beleaguered program if the agency couldn't prove to him within two months that it was on the right track [CW, April 1].

A spokeswoman for Lightfoot, who is chairman of the House Subcommittee on Treasury, Postal Service and General Government, last week said the congressman had received a "progress report" from the IRS but "serious concerns remain."

The subcommittee will meet this week to work on funding legislation for the IRS, the spokeswoman said.

Accounts believable?

IRS' record of uncollected assessments as of Sept. 30, 1995

$9B $14B $14B $19B $39B $96B

Notices sent
Deferred/Other
Court action pending
Payment agreement reached
Undergoing collection action
Collection not possible

TOTAL: $191B

Coming soon: R/3 on AS/400

IBM and SAP AG are reprising the one-stop shopping song to win new customers at small and midsize companies.

Beginning next month, the two vendors will deliver SAP's integrated R/3 software preloaded on IBM's AS/400 machines, which could shave up to three days and thousands of dollars from the average R/3 installation. This is the first time R/3 has come preloaded on any platform.

The vendors also will give users joint hardware and software support. "Customers will still have two service contracts, one with IBM and one with SAP," said Hartmut Schaper, an SAP official at Walldorf, Germany. But users will pay roughly the same licensing fees as users on other R/3 platforms. Currently, it costs about $4,000 per user for SAP financials. — *Julia King*

Vendors ready groupware barrage

Novell, Lotus, Oracle and Microsoft engage in the battle of the beta tests

By Tim Ouellette

Groupware vendors are beta-testing a slew of products this summer, promising users a number of new options by early fall.
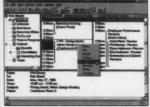
The most significant move was Novell, Inc.'s release two weeks ago of the full-featured beta version of GroupWise 5.0, the upgrade to GroupWise 4.x installations.

Lotus Development Corp. is beta-testing Domino, its combined Notes/World Wide Web server [CW, June 3], and Oracle Corp. has been testing InterOffice, a groupware suite based on the Oracle7 database, which ships this week.

For its part, Microsoft Corp. is following the successful beta program of its Exchange Server with a small test of its free, low-end Internet Mail client software.

With GroupWise 5.0, Orem, Utah-based Novell is playing catch-up to groupware releases this year from Lotus (Notes 4.0) and Microsoft (Exchange).

Novell GroupWise 5.0 *beta testers said the multitude of features in the Universal Mailbox makes it stand out from the crowd*

But early beta users and analysts said the easy access to a busload of information — including appointments, workflow tasks, contacts, documents and electronic-mail messages — in GroupWise's Universal Mailbox differentiates it from Notes and Exchange.

Easy administration

For other users, better administration is the meat and potatoes.

"We've noticed the biggest improvement is in the administration utilities through NWAdmin, [the NetWare network administration utility]," said Ken Ainge, a GroupWise beta tester at KTVX, a television station in Salt Lake City.

Users will be able to manage GroupWise 5.0 from within their NetWare management screen, and non-NetWare shops will be required to run one NetWare server for administration. This won't affect the performance of GroupWise 5.0 on other server platforms, Novell officials said.

GroupWise 5.0 initially will be available for NetWare and Windows NT servers, with Unix and OS/2 server support expected later this year. GroupWise 5.0 is still slated to ship in late summer, with one additional beta release scheduled to improve overall performance of the software, the officials added.

Notes meets the Web

With Domino, Lotus makes good on a promise it made in December to have Notes work hand-in-hand with Web technology. Domino offers native Hypertext Transport Protocol support inside a Notes server.

Both Notes clients and Web browsers will be able to access Notes applications and documents. Domino can store Hypertext Markup Language (HTML) documents and will translate Notes documents to HTML format.

"It's definitely something we could use for an intranet," said Jeffrey Harris, a Domino beta tester and senior network engineer at Integrated Data Systems in Chantilly, Va.

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Data Warehouse

CA, DEC offer improved management for OpenVMS

By Jaikumar Vijayan

Computer Associates International, Inc. and Digital Equipment Corp. recently announced a broad strategy to allow OpenVMS users to manage their platforms from a Windows NT or Unix environment.

Under the plan, CA will enhance and integrate a range of Polycenter systems management products — recently acquired from Digital — with its CA-Unicenter The Next Generation enterprise management platform [CW, April 29]. Both Maynard, Mass.-based Digital and CA, based in Islandia, N.Y., will sell and support these products when they become available by year's end.

"The good news is that if you are a DEC user currently using these Polycenter products, you don't have to worry about them suddenly going away," said Terry Shannon, editor of "Shannon Knows DEC," a newsletter in Ashland, Mass.

CA's road map comes just days after the company detailed an alliance with Digital. Announced in April, the alliance specified CA's acquisition of 11 of the just over 30 Digital Polycenter products.

Road map for Polycenter

- Provide CA-Unicenter The Next Generation native support for DECnet
- Upgrade individual Polycenter products to OpenVMS Version 7.0
- Introduce Windows NT and HTML-based workstations for Polycenter
- Ship CA-Unicenter for OpenVMS

Announced at the Digital Equipment Computer Users Society show in St. Louis two weeks ago, CA's merged product will be called Unicenter for OpenVMS, according to Yogesh Gupta, a senior vice president at the company. Pricing wasn't available.

In the next two months, CA will provide native support for DECnet on Unicenter, allowing Digital users to manage OpenVMS, Digital Unix and Windows NT platforms as a single management infrastructure.

CA will also introduce by year's end new Windows NT and Hypertext Markup Language (HTML)-based management workstations for individual Polycenter point products and upgrade each of them to the latest versions of OpenVMS.

"It is going to be a unified enterprise management environment where [OpenVMS] users can manage all their resources from a single interface," Gupta said.

It's got potential

Some users welcomed the move.

"The integration sounds like a potentially very useful thing for users, particularly in distributed and heterogeneous environments," said Brian Cutler, VMS system manager at the State University of New York at Albany.

Polycenter users should benefit in the long run because of the more concentrated and specific focus that CA has in the systems management area compared with Digital, said Douglas McPherson, a principal network engineer at Innovative Telecom Corp. in Nashua, N.H.

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70. Mining/Construction/Petroleum/Refining/Agriculture
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95. Other_____
(Please specify)

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23. Dir./Mgr. Sys. Development, Systems Architecture
31. Programming Mgmt., Software Developers
41. Engineering, Scientific, R&D, Tech. Mgmt.
60. Sys. Integrators/VARs/Consulting Mgmt.
CORPORATE MANAGEMENT
11. President, Owner/Partner, General Mgr.
12. Vice President, Assistant VP
13. Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
51. Sales & Marketing Mgmt.
70. Medical, Legal, Accounting Mgmt.
OTHER PROFESSIONAL MANAGEMENT
80. Information Centers/Libraries, Educators, Journalists, Students
90. Other Titled Personnel

3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply)
Operating Systems
(a) Solaris   (e) Mac OS
(b) Netware   (f) Windows NT
(c) OS/2   (g) Windows
(d) Unix   (h) NeXTstep
App. Dev. Products ☐ Yes ☐ No
Networking Products ☐ Yes ☐ No

4. How many people are employed at this location and in your entire organization, including all of its branches, divisions and subsidiaries? (Select only one per column.)

	1. At this location	2. Entire Organization
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B. 10,000 – 19,999	☐	☐
C. 5,000 – 9,999	☐	☐
D. 1,000 – 4,999	☐	☐
E. 500 – 999	☐	☐
F. 100 – 499	☐	☐
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MasPar takes on new name and softer edge

By Dan Richman

Say good-bye to MasPar Computer Corp. and say hello to NeoVista Solutions, Inc., the most recent entrant in the data mining field.

Cupertino, Calif.-based MasPar, which in its eight years sold 260 massively parallel machines to military, scientific and engineering sites, last week changed its name and mission, quitting the hardware business to become a provider of data mining software.

Data mining

New page
The shift offers MasPar a fresh start and users an alternative to competitors' data mining software, industry observers said.

NeoVista's Decision Series data mining product is based on pattern-recognition algorithms that MasPar developed with end users of its hardware. Designed for applications such as fingerprint recognition or radar detection, those algorithms were easily adapted to data mining, NeoVista CEO John Harte said.

Data mining refers to discovering unknown patterns within data. It is antithetical to conventional querying of data, which seeks specific answers to specific questions.

Beta user Denise Barnhart, chief of corporate analysis at Army Air Force Exchange, said Decision Series will permit her organization to examine sales trends at a much finer level. Army Air Force Exchange stocks 15,000 stores at bases throughout the world.

"To estimate sales based on buying patterns and demographics, we look at sales by stores and region today," she said. "We think NeoVista will let us drop down to the category or even the product level."

The new software, expected to ship Oct. 1, will compete most closely with Intelligent Miner from IBM and the Database Mining products from HNC Software, Inc. in San Diego.

"[This] breathes new life into MasPar, which flourished in the Cold War days but faded as its proprietary technology couldn't find more generalized uses," said Jeff Liebl, a research analyst at Smaby Group, Inc. in Minneapolis.

What a difference a day makes

	Before June 11	After June 11
Name	MasPar Computer Corp.	NeoVista Solutions, Inc.
Main product	MP2, a proprietary massively parallel computer	Decision Series, data mining software

Intel, MCI ink server alliance

By Mitch Wagner

Intel and MCI's Web server software *was designed to give users easy-to-use graphic administrative tools*

Intel Corp. and MCI Communications Corp. teamed up last week to unveil a preconfigured, aggressively priced World Wide Web server, that targets corporate departments and small businesses.

The partners also announced plans to jointly develop technology to beam multimedia over the Internet.

Winning Internet users will be difficult for MCI and Intel, predicted user Geoff Ralston, vice president of engineering at Four11 Corp. in Menlo Park, Calif. Server systems and software aren't strengths for either company, he said.

"Two [companies] not really known for their servers and software are coming in to a market where a lot of big boys with big expertise in that are already duking it out," Ralston said. Four11 runs a directory of telephone numbers and electronic-mail addresses on the Internet.

The NetworkMCI WebMaker incorporates server hardware based on Intel's 200-MHz Pentium Pro processor, with Web-Server software, design tools, configuration and three years' service and support.

It is available now and is priced at $9,995. The design software on the WebMaker server includes a "wizard" that steps users through the process of laying out content online — a cookbook for putting together a simple Web site.

One catch: The $9,995 price tag doesn't include Internet connectivity. MCI will provide that at a cost of $2,000 to $2,300 per month, depending on the speed of the line.

Internet setup costs could run even higher depending on how much wire has to be laid to stretch from MCI's network equipment to the customer business.

Multimedia performance
The multimedia portion of the alliance will see the two companies focus on networking technology to improve performance of multimedia applications on the Internet.

Multimedia apps on the 'net consume huge amounts of bandwidth and are therefore highly susceptible to the kinds of slow-downs and brownouts that are becoming more common as the 'net becomes more popular and demand for Internet services increases.

Intel and MCI will work to develop multimedia applications that include real-time video, audio and videoconferencing for the Internet.

The firms wouldn't provide specifics.

IBM promises to keep Tivoli open

By Bob Francis

AUSTIN, TEXAS

Mollifying skeptics in the user community and among other systems management vendors, IBM recently set forth some plans for its Tivoli Management Environment (TME).

Following weeks of meetings here, systems management vendors said IBM appears dedicated to developing and adhering to standards. In some cases, IBM will provide application programming interfaces to integrate third-party systems management products into TME.

"Most of us were satisfied that IBM wants to keep Tivoli open and form tight relationships with the top two or three vendors in each area of system management," said one third-party official who declined to be named.

IBM's goal is to offer systems management tools across eight disciplines, said Brian Burba, an analyst at International Data Corp. in Framingham, Mass.

When IBM acquired Tivoli and its system in January for $743 million, many vendors and users expressed concern about the computer giant's support of systems management products from rival firms. Those third parties wanted assurance that they could continue to plug their software — such as individual applications that provide security, database management, scheduling or storage management — into Tivoli's management framework.

This move on IBM's part toward more active partnerships is comforting news to users, particularly those considering systems management frameworks.

"We're looking at distributed system management frameworks right now, and it's very important [to know] how they're going to work with our third-party solutions," said Anthony Flora, senior vice president at NationsBanc Services, Inc. in Richmond, Va.

"We're still in the midst of deciding what to do," Flora added, "but I don't think we want to have to change our whole organization just to use a framework when we have point solutions that work now."

Third-party developers and some users feared that IBM would give its own products preferential treatment under TME.

"Basically, IBM knows they can't provide the users with all the painkillers, and they made it clear they want to partner with us so they can provide this framework" of point products, said Flip Flipowski, president of Platinum Technology, Inc. in Oakbrook Terrace, Ill.

IBM's SystemView has traveled a rocky road since it was introduced in 1990

SystemView announced. Designed to manage distributed environments for VMS, AS/400 and AIX.

Few products use the System-View name; integration is nil, and no third-party products are included.

IBM puts on the jumper cables and announces it is opening up SystemView and plans to port some applications to non-AIX Unix systems.

IBM purchases a new car – a Tivoli. It's a sportier model and third-party systems management vendors are eager for a ride.

1990 1991 1992 1993 1994 1995 1996

Source: IBM, International Data Corp. and Computerworld

The NCR Scalable Data Warehouse.

Sniffer gets help

Network General Corp. in Menlo Park, Calif., is preparing to broaden its focus on network fault and performance management beyond the Sniffer line of protocol analyzer tools. The vendor last week purchased a preferred stock equity interest in **Netsys Technologies, Inc.** in Palo Alto, Calif. Netsys provides planning and troubleshooting software for router-based networks. Network General will include Netsys software in a Network Visibility Solution Set to be introduced next month, sources said.

CommVault goes it alone

CommVault Systems, Inc. in Eatontown, N.J., last week became an independent provider of storage management tools for distributed client/server networks. Backed by **Donaldson, Lufkin & Jenrette, Inc.**, managers led a buyout of the former division of AT&T Corp., which was spun off recently as part of Lucent Technologies, Inc.

Computer Industry

Microsoft purchase speeds online push

Retailers at EShop Plaza *are moving to a site that is under construction on The Microsoft Network*

By Kim S. Nash

Microsoft Corp. last week bought electronic commerce software maker EShop, Inc. and immediately shut down the company's online shopping mall, which sold clothing, compact discs and other consumer products.

Users previously could click on a merchant's icon at EShop Plaza to get in to the merchant's online store. Now, a click triggers a message that says EShop stores will be transferred to The Microsoft Network World Wide Web site, which is under construction. The message advises users to leave their electronic-mail addresses so that they can be notified when the migrations are done.

Some EShop retailers, such as Avon Products, Inc. and Spiegel, Inc., could still be reached via their own Web sites. But Tower Records and Video and others don't run separate sites.

Two retailers contacted by *Computerworld* didn't know that access to their online stores had been cut off.

The acquisition of EShop, in San Mateo, Calif., means Microsoft must port EShop's Unix-based commerce software to its Windows NT operating system. Financial terms of the deal weren't disclosed by either company. Microsoft has promised to ship an NT version of EShop by the end of the year. Beta tests will start in August.

Electronic commerce

May not reopen

But some EShop merchants said they didn't know if they wanted to reopen at the NT-based mall.

"There may be some issues because all our data is in a Unix database," said a spokesman for The Good Guys, an electronics chain based in Brisbane, Calif. The Good Guys, which is an IBM RS/6000 shop, "will probably let EShop make those decisions," he said. "That's why we signed up with them; otherwise, we'd have built a shopping mall ourselves."

The acquisition will jump-start Microsoft's original plan to ship electronic commerce software by the end of the year, but it doesn't put it ahead of Netscape Communications Corp. or Open Market Corp., which already offer such applications.

Buying EShop's products knocks one to two years off Microsoft's development cycle, according to Paul Maritz, vice president of the platforms group at Microsoft in Redmond, Wash.

The vendor had planned to introduce Microsoft Merchant by the end of the year, but the first version wouldn't have included advanced features such as complicated inventory tracking capabilities or custom Web page generation for repeat shoppers. "This lets us ship elements [that] we would have gotten to only in Versions 2.0 or 3.0," Maritz said.

Minicompanies in megamerger

By Frank Hayes

Question: When does a $40 million company merging with another $40 million company equal a deal worth an estimated $900 million?

Answer: When stock values of the two companies are sky-high.

Just how out of whack some software company valuations have become was evident earlier this month when Pure Software, Inc. announced plans to merge with Atria Software, Inc.

Mergers & acquisitions

When the stock-swapping deal goes through, Atria shareholders will receive about $900 million in Pure stock. That is more than 20 times the $40 million in sales achieved last year by Lexington, Mass.-based Atria.

"That's an outrageous valuation for the company," said Ed Bierderman, research director at Dakin Securities Corp. in San Francisco. "Until recently, the only stocks trading that high were Internet stocks, and they're trading on hype."

On the low end

By comparison, Hewlett-Packard Co. and Sun Microsystems Inc. are valued at about 1½ times their sales, and even high-flying Microsoft Corp. is valued at less than eight times its revenue.
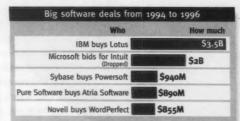
But Pure, in Sunnyvale, Calif., didn't hesitate to pay the price — in part because its stock is worth roughly 15 times its annual revenue. "The price was determined by the public market," said Chris Tuttle, an analyst at SoundView Financial Group in Stamford, Conn.

The merger of Pure and Atria makes sense, said Dick Heiman, an analyst at International Data Corp. in Framingham, Mass. Pure sells tools for testing software under development, and Atria's products manage the development process.

"I'm pretty positive on this. But I find it hard to believe that a company with $80 million in revenue is worth $1.7 billion," Heiman said.

Skyrocketing stock prices have become a hallmark of Internet-oriented companies such as Netscape Communications Corp. and Yahoo, Inc. But valuations of Pure and Atria have pushed into record-breaking range a merger that might otherwise be routine, analysts said.

Less than two years ago, database maker Sybase, Inc. paid what analysts called a premium price of $940 million for Powersoft Corp. This is roughly Atria's price, though Powersoft had three times Atria's sales.

Not all big-money software acquisitions have fared well. IBM's $3.5 billion purchase of Lotus Development Corp. in Cambridge, Mass., has seen less than spectacular results. And Novell, Inc.'s ill-starred $855 million purchase of WordPerfect Corp. ended earlier this year when Corel Corp. took over WordPerfect for a fraction of that price.

Stocks drop

In fact, the market responded negatively to the Pure/Atria deal. When the merger was announced, Pure stock was at $39.50 and Atria at $64. Within a week, Pure had fallen to $36, and Atria had dropped to $54, reducing the merger's price from $973 million to $890 million.

But in this case, "what you call the price of the deal is really irrelevant," said Paul Hilal, a principal at Broadview Associates LLC, a Fort Lee, N.J., merger and acquisition advisory firm. "It's like saying you've bought a billion-dollar dog and paid with two $500 million cats." They may be overpriced, but they are all overpriced about the same, he said.

Big software deals from 1994 to 1996	
Who	**How much**
IBM buys Lotus	$3.5B
Microsoft bids for Intuit (Dropped)	$2B
Sybase buys Powersoft	$940M
Pure Software buys Atria Software	$890M
Novell buys WordPerfect	$855M

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OF THE PAST. TODAY, IS MANAGERS NEED MULTIFACETED STRATEGIC PLANS THAT CAN BE UPDATED EVERY FEW
WEEKS OR MONTHS. ARE YOU PART OF THE PROBLEM OR PART OF THE SOLUTION?

Strategy no longer equates with long term. The economy is volatile, resources are severely constrained and competition is global. The pace and complexity of business have grown by orders of magnitude. Threats and windows of opportunity come and go in weeks or months. Businesses have had to learn to be dynamic and capable of numerous simultaneous initiatives. Strategy can no longer be planned years in advance.

This fundamental business change demands an equally dramatic change in the role of management, information systems management included. The executive who attempts to determine strategy and personally manage its implementation quickly becomes a bottleneck. A command-and-control-oriented "foreman" cannot hope to handle the diversity of challenges the organization faces.

The CIO as foreman

Consider the management style of the chief information officer at a high-tech equipment manufacturing company. The company had grown rapidly into worldwide markets, and its aging data processing systems couldn't handle the increased demands for throughput, flexibility and integration. The CIO determined that a complete revamp of all the legacy applications was warranted.

So the CIO committed the IS organization to an aggressive multiyear plan. He acquired a complex multiple-application client/server package, and the IS department embarked on its worldwide rollout.

Then the problems began.

Problem 1: Missed deadlines.

The IS department couldn't deliver the project on schedule. The time estimate for the project was based solely on the CIO's knowledge of project management. It didn't benefit from his staff's much deeper understanding of the legacy applications that had to be converted, or take into account other commitments — such as keeping the current business running — or the staff's abilities and learning curves.

Problem 2: Poor management. The CIO devoted most of his time to managing the project rather than improving the organization's ability to manage projects.

With his time limitations, he couldn't look after every detail. The project was too big and complex for one person to manage, no matter how

> The executive who tries to determine strategy and manage its implementation quickly becomes a bottleneck.

bright that person may be.

Problem 3: Missed opportunities. The IS department did little besides keep the business running and implement the package. The CIO was the only channel for identifying new projects, so virtually no effort was put into discovering "golden apples," or well-focused tools to help key executives succeed with their business strategies. The entire department focused on administrative applications, so they missed potentially high-payoff opportunities and many client executives felt ignored.

Manager vs. leader

This CIO may have been a decision maker, but he was not a leader. He ignored the extensive knowledge in the organization, thinking that he knew better than his staff. And since everything had to funnel through him, he became the constraint. Meanwhile, he did nothing to ensure that the organization was able to implement his decisions. When this CIO was asked to leave, the company inherited an IS function no more capable of delivering strategic value than it had been when the CIO arrived.

The model of the executive as foreman may be obsolete, but many

Illustrations by Eric Bowman

managers still manage this way. The result is wasted time, talent and opportunities.

IS needs leaders, not managers. Managing is the time spent supervising people and doing the day-to-day work of the organization; leadership is the time spent improving the way the organization operates.

Empowerment, that hackneyed term that gets a lot of lip service but very little respect, is at the core of good leadership. But if empowerment means anarchy, organizations will fail. Empowerment cannot occur unless management direction is replaced with other coordination and control mechanisms.

The organizational environment can be designed to send signals that guide everyone in their work. By "programming" the organization, leaders can subtly influence every decision, every day, without disempowering and micromanaging people.

With every bright mind engaged, a well-designed organization can be highly responsive on many fronts.

Visionary leadership

The CIO at a large petrochemical firm — let's call him Bill Smith — provides a positive example of leadership. Bill manages a reliable, cost-effective IS organization, and midlevel business managers throughout the corporation have been reasonably satisfied with its services.

But about three years ago, Bill saw trouble on the horizon. Senior executives did not view IS as strategic; they were grumbling about costs and lack of responsiveness, and some were proposing decentralization and outsourcing.

Meanwhile, IS staff were overworked and underappreciated and had virtually no time to learn new technologies and skills. IS provided only limited guidance on architectural standards. Furthermore, the department was failing to recover its costs through chargebacks, a risky proposition in a corporation that was downsizing.

Bill took action with the help of his senior IS management team. They interviewed key business-unit managers about their concerns with the IS department and surveyed IS staff about departmental problems.

The team then met in a series of workshops. In the first workshop, they discussed visionary expectations

> If empowerment is casually applied, organizations will fail.

of the department and assessed the gaps in their ability to meet these expectations.

In the next workshop, they analyzed all the issues raised by clients and staff members and their own assessment of gaps. They found four major areas of concern:
- Poor relations with clients.
- More work than they could handle.
- A lack of technology innovation.
- Little leadership on technology architecture.

In each case, the team analyzed root causes.

For "poor relations with clients," they traced its roots to a number of things:

1) **Culture.** The IS culture didn't include the practice of forming clear contracts, leading to misunderstandings over the scope of projects. And because there was no internal consultancy, no one was available to review all the business that the client was doing with the IS department.

2) **Structure.** The IS department's structure didn't include a full-time consultancy function that could serve as an account representative, so executive-level clients felt ignored.

3) **Methods.** Executives felt IS wasn't delivering systems that contributed in significant ways to the clients' business strategies. The management team recognized that its methods of identifying strategic opportunities (finding high-payoff applications for clients) and measuring benefits (documenting the payoff of

The Organizational OS

The five dimensions of organizational design can be likened to the organization's "operating system":
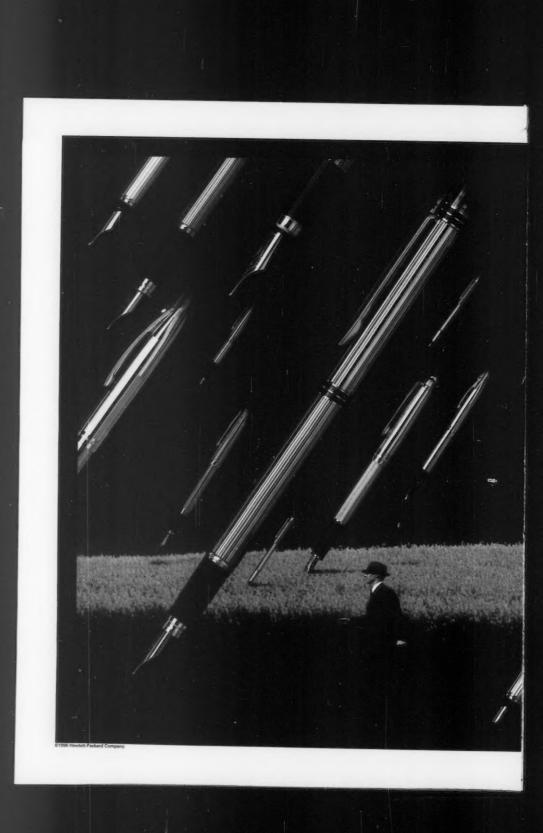
1. Culture: The behavioral patterns (habits and conventions) generally adopted in the organization. Indications of the need for cultural change include a lack of customer focus, entrepreneurship, empowerment, quality or teamwork.

2. Structure: The definition of jobs and the reporting hierarchy, as well as the processes that combine people into teams as work flows across organizational boundaries.

3. Methods: The procedures, methods and skills that people use, such as project management, customer service, entrepreneurship and marketing and business planning.

4. Internal economy: The budgeting, priority setting, chargeback and project-approval processes that determine how resources flow.

5. Metrics: The feedback loops that inform people about how they are doing, and the incentives for improving performance.

> Feedback lets people know how they're doing in time to adjust their behavior. It can give them incentive for improving performance, too.

IS investments) were lacking. The team attributed these weak methods to the lack of an internal consulting group — people with time to learn and use such methods.

4) Internal economy. Complaints about costs, as well as pressures for decentralization and outsourcing, were partially rooted in the organization's internal economy, which didn't give individual business units control over IS expenditures. Even though IS charged for its services and clients decided what they would buy, prices were confusing, and there were many cross-subsidies.

5) Metrics. External benchmark metrics of costs were lacking, so IS couldn't prove that its services were indeed reasonably priced compared with other IS departments.

The second problem area, "more work than they could handle," resulted in overworked and underappreciated staff and the appearance of unresponsiveness.

Bill and his team traced the root cause to the IS department's internal economy, which failed to balance supply and demand. Prices didn't cover the full costs of produc-

ing some products, and supply wasn't allowed to "float" to meet demand. The lack of clear contracts (which is a culture problem) exacerbated this problem.

The "lack of technological innovation," the third problem area, was traced to the IS department's structure and the internal economy. As for structure, the same IS staff were responsible for both innovation and operations. While they were charged with developing new systems software and networking solutions, they were also required to "keep things stable," which squelched innovation.

As for the internal economy, schedules and prices assumed that IS employees would spend 80% of their time on clients' projects; that left little time for learning. Furthermore, there was no source of "equity" funding to finance research and development of new lines of business for the IS department.

And the root cause of the fourth problem, "little leadership on technology architecture," was attributed to the IS department's structure,

which had no full-time technology architect or methods for dynamic architecture planning.

The action plan

Bill and his management team then developed an action plan that systemically addressed their concerns. The team committed to an ambitious transformational process that included the following components:

1) **Culture.** They crafted a set of principles of accepted behavior that could influence in real, actionable ways the day-to-day behavior and decision-making in the department. These principles included themes of entrepreneurship and customer focus. One example: "We offer our customers technical alternatives and inform them of the life-cycle costs of each, and then let them choose."

2) **Structure.** They restructured the department, beginning with a blank sheet of paper. The new structure includes a consultancy that is dedicated to client partnership and an architecture function that facilitates consensus on standards. The new

A Leadership Action Plan

There are six basic steps that leaders can take in order to build healthy IS organizations:

1. Gather data on clients' and employees' attitudes. You may find a mandate for change.
2. Have your management team think about what will be expected of the IS function in the future. It's probably a lot more than they're doing today.
3. Analyze the root causes of the concerns raised, using the organizational operating system detailed on page 3. The many symptoms recognized by clients, employees and management all probably

point to the same few root causes.
4. Don't build organizational structures around personalities or politics; use a systematic principles-based approach applied to each of the dimensions so you don't have to reorganize again next year.
5. Sequence corrective actions into a rational, well-paced transformation.
6. Communicate the symptoms ("we heard you") and the action plan (not the management fad of the month, but an integrated, systemic program). You'll need patience and understanding from both clients and staff.

structure also separates innovation from operations functions to avoid conflicts of interest.

3) Methods. They trained the new consultants in leading-edge methods for identifying strategic opportunities and measuring benefits and trained the architects in dynamic, participative methods of architecture planning.

4) Internal economy. They identified product managers responsible for all the costs of a product line. These people began to redesign the internal economy to unravel pricing subsidies and clarify product revenues and costs, identifying many opportunities for streamlining.

5) Metrics. They benchmarked their costs (favorably) against competitors and advertised the results to client executives.

Bill recognizes that there is more to do, but the results so far are impressive.

Relationships with client executives have improved, and the IS consultants are now participating in the strategic planning of many business units. Top executives were impressed by the benchmarks, and pressures for outsourcing have dwindled. Clients understand the business value of architecture and are enthusiastically supporting standardization. Internal

processes have been streamlined, overhead and direct costs have dropped by 15%, and the department is close to its break-even goal.

And while corporate strategies come and go, the IS organization has been stable. It mixes and matches its various entrepreneurs on project teams as needed, and consultants continually work with key clients to identify high-payoff opportunities for strategic systems.
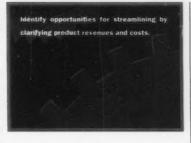
In what is perhaps the highest praise, one business unit manager contracted with corporate IS to take back his local IS group, which was decentralized some years earlier because of frustration with the corporate IS department. Another staff function, finance, is now analyzing how to merge its decentralized IS staff into the corporate department.

Success for the future

To survive in chaotic times, organizations must be dynamic. They must innovate, align with diverse clients' strategies, improve internal processes for project delivery and operations, and integrate their products. And they must do all these things at once, not one at a time as special projects. They also must do them all continually, not once a year as part of a plan.

Executives who try to control everything themselves are destined to fail — and are likely candidates for ulcers.

The proper role of an executive is that of leader, not fore-

man, focusing on issues of governance rather than technologies and projects.

Through systemic change, leaders build healthy, high-performance organizations that succeed — with or without them. ◆

Additional reading

◆ *Leadership and the Computer,* by Mary E. Boone, Prima Publishing, Rocklin, Calif., 1993.

◆ *The Heart of the Enterprise,* by Stafford Beer, John Wiley & Sons, Chichester, England, 1979.

◆ *Structure in Fives: Designing Effective Organizations,* by Henry Mintzberg, Prentice-Hall. Englewood Cliffs, N.J., 1983.

◆ "Rightsizing Angst," by Alice La-Plante, *Forbes* magazine, June 7, 1993.

◆ "A Sensible Approach to Outsourcing," by N. Dean Meyer, *Information Systems Management,* Vol. 11. No. 4, Auerbach Publications, fall 1994.

Identify opportunities for streamlining by clarifying product revenues and costs.

One company trained staff in ways to identify strategic opportunities and measure benefits.
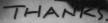
ABOUT THE AUTHOR

Author, lecturer and consultant N. Dean Meyer has implemented organizational transformations in dozens of diverse corporate and public-sector organizations. In 1982, Meyer founded NDMA, Inc. to focus exclusively on organizational issues. He is co-author of the book *The Information Edge,* with Mary E. Boone, and author of the new book *Structural Cybernetics: An Overview.* For more information, see NDMA's Web site at http://www.ndma.com or contact Meyer at ndma@ndma.com.

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Love/hate story

I recently asked a group of managers from manufacturing companies how many of them work regularly with their information systems departments. Nearly all of the 300 or so people raised their hands. Then I asked who *likes* their IS department. Fewer than 50 hands stayed up.

That's sobering news if you're in IS. But unfortunately, such anecdotal evidence is all too common these days. And it's backed up by our annual survey of top business executives' attitudes toward IS, which begins on page 84 of this issue.

While the managers we surveyed were overwhelmingly positive about the contribution that information technology is making to their businesses, more than half were less than satisfied with the quality of application development, project management and flexibility coming out of their own IS departments. As one financial analyst commented, "There are good people [in IS] . . . but all too often they're order-takers and backlog creators."

Evidence like this tends to bolster a suspicion I've had for some time: The IS function as currently defined in most large corporations can't be done. IS professionals are trying to help their business partners navigate a river of business opportunity while swimming against a relentless current of technology change.

Consider that a year ago, most IS organizations were wrestling with what to do about two-tier client/server and Windows 95. Now they're worrying about Java, intranets and multitier client/server. Who can execute strategic plans when the technology environment changes so fast? How can users, who are accustomed to buying new desktop systems and software every 12 months, be convinced that transitioning to a new set of financial applications takes longer?

Perhaps the answer is, as the bumper sticker says, to think globally and act locally. Executives no longer have to be convinced of the business value of IS. But they do want their IS groups to be responsive, interactive and interested.

Maybe it's time to think less about re-engineering and more about help desks, training and putting more of your staff out there with screwdrivers in their hands.

Paul Gillin, Editor
Internet: paul_gillin@cw.com
www.ultranet.com/~pgillin

HOW FAST CAN AN 800-POUND GORILLA RUN?

DRINK JAVA

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MICROSOFT

VISUAL BASIC

Top reason not to print sexist drivel

There is nothing insightful about the "Top 10 reasons why computers must be male" list that you unfortunately republished ["Inside Lines," CW, June 3].

This is sexist drivel and extremely insulting to men. I would suggest you reread the same list as "Top 10 reasons why computers must be female" and see how it feels from your perspective. It just promotes the current fashion of male-bashing that is so prevalent in much of the media and advertising in recent years.

Printing this list is degrading to the reputation and quality of *Computerworld*.

Steve Perrenod
Mountain View, Calif.
perrenod@sgi.com

3Com switch swap pays off in goodwill

I would like to respond to ["3Com pulls switches," CW, May 27]. As an owner of 25 single power supply 3Com LANplex 2500s on a large network, I want to commend 3Com for quickly and efficiently replacing our LANplexes.

We knew about the power supply connector problem late last year but decided to hold off on replacement until it was convenient.

Because we tolerate no network downtime, we were happy that 3Com decided on a swap-out program whereby they shipped us new units in advance. The new units had updated software and newly revised motherboards.

We did a quick configure, put them in place, powered them up, swapped the cables over and were done — with no downtime.

The swap-out program may have cost 3Com some money, but it pays for itself in customer goodwill.

David W. Foss
Computer systems manager
MIT
Cambridge, Mass.

Options to avoid GPFs

Maybe the article "Memory leakage the cause of GPFs" [CW, May 27] should have said, "GPFs are a fact of life *for Microsoft users.*"

For years I have run Unix systems that never had a General Protection Fault. My UnixWare system didn't crash in three years of constant use. My Mac doesn't have GPFs, either, and OS/2 was very robust for me as well. Let's not forget that there are options other than Microsoft.

Skip Steuart
Washington
76116.230@compuserve.com

Hey, buddy, got a PowerBook?

I saw your report ["Mission Implausible?" CW, May 20] that an Apple PowerBook is used in the new *Mission: Impossible* movie. Why, to light the fuse?

Paul Wetor
Milwaukee
pjwetor@mke7.ra.rockwell.com

Mobil's IS is OK

Regarding "Mobil revamp devastates IS" [CW, April 29], your reporter came to Mobil to write an article on the subject of electronic commerce. We were happy to assist his research.

The story is clearly about electronic commerce. What I find difficult to understand is how the headline came to appear above such an article. It seems unrelated.

Mobil's restructuring has not "devastated IS." Restructuring initiatives have been undertaken throughout the company's business operations with one specific purpose: to allow us to continue to compete effectively. This same process underlies our interest in electronic commerce — to cut costs while improving the way we manage our business.

I would also like to correct a significant error: Ms. McCoy's name. She is Ellen I. McCoy, not Eileen M. McCoy as reported.

We feel the headline misrepresents the situation in our IS group, which is making groundbreaking steps into the field of electronic commerce, much as described in the rest of the article.

Christopher O. Springham
Media relations
Mobil Corp.
Fairfax, Va.

■ Computerworld welcomes comments from its readers. Letters should not exceed 200 words and should be addressed to Paul Gillin, Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax number: (508) 875-8931; Internet: letters@cw.com. Please include an address and phone number for verification.

Michael Gentle

Find out if you're a U.S.-centric IS manager

Multinational companies usually have a corporate information systems office or committee that handles international standards and coordination. It tries to reconcile the IS needs of business units in different countries.

Like all corporate functions, its performance and approach can vary widely.

On one end of the spectrum, this office is a lean, internationally street-wise organization that skillfully balances corporate and domestic requirements. At the other end is a bloated, inward-looking bureaucracy that supports numerous technology standards, even when they aren't practical in some countries.

Do you balance the IS requirements of headquarters and foreign business units?

How do you rate?

Where does your organization sit on this scale? Take this test and score one point for each statement that is true in your international division.

1. A U.S. project leader proposes a key meeting with his European colleagues for May 1. He is surprised to find that no one else is working that day. (It's Labor Day in much of Europe.)

2. The corporate IS department is 100% composed of staffers who haven't worked abroad. Their idea of foreign business awareness is knowing that date fields in the rest of the world are written day/month/year.

3. Software selection committees don't have international representation. Members are techies for whom adherence to alphabet-soup standards

— with a half-life of six months — is more important than local business needs and the presence of adequate incountry technical support.

4. The Very Important Planning Committee concludes that, because the new sales-automation package has been successfully pilot-tested in Puerto Rico and Poland, the product should have no problem scaling up to larger and more complicated markets such as England and France.

5. The IS department imposes the "worldwide, QWERTY keyboard standard" so traveling executives from headquarters can check their electronic mail from abroad without having to deal with foreign keyboards.

6. Telephones in all subsidiaries

ILLUSTRATION BY PETER BONO

are identically programmed, right down to the function keys, so employees who are traveling abroad can phone home without having to ask the natives how to get an outside line.

7. Headquarters issues a condescending International Cabling Standards handbook, which warns foreign personnel not to plug a server in to a washroom shaving outlet.

8. Corporate staffers are viewed as productive only when they visit other countries, thereby making frequent-flier miles an acceptable measure of performance for the annual review.

Scores:

0: A first-class act! Your organization has obviously accepted the necessity of balancing essential corporate standards with the equally essential requirement of letting countries run their business without too much disruptive interference from corporate headquarters.

1-5: Beware! Bureaucratic tendencies have begun to set in. If not checked soon, corporate IS will be more of a hindrance than a help to the business units it's intended to serve.

6-8: Yours is an internal-looking organization with a vested interest in having as many standards as possible (including frivolous ones), whether or not they're adequately supported by a business case. In short, the bureaucracy is a cross between the United Nations and the federal government.

Gentle is an IS project manager at SmithKline Beecham Pharmaceuticals in Paris.

Susan Scrupski

An unshackled giant, bigger than Microsoft

The liberation of Electronic Data Systems Corp. from General Motors Corp. will affect not only the computer services industry but, over time, the larger worldwide technology market.

With revenue that topped $12 billion last year and an employee base of more than 95,000 worldwide, EDS (as has been aptly pointed out by *The Wall Street Journal*) is already larger than technology giant Microsoft Corp.

During the past decade, the growth of EDS has been fueled by an aggressive sales machine and a fertile market opportunity. Some of the transactions the company pursued privately and publicly were on such a grand scale that, if brought to fruition, they would have changed the technology landscape considerably — possibly irrevocably.

Ready to roll

Consider the attempted EDS and Sprint Corp. merger. In its day, it would have been a seminal example of a "convergence" titan, with the kind of computing and communications muscle to create a new breed of 21st-century technology player.

EDS faces new possibilities. Armed with the flexibility and strength of trading with its own

Get ready for an emancipated EDS, which may transform the kind of technology industry.

Possible acquisition targets include Netscape, TCI, Dow Jones and MCI.

stock, EDS could make a play for any niche company. The possibilities are endless: Will it be Netscape Communications Corp.? Tele-Communications, Inc.? Dow Jones & Co.? MCI?

Even though GM has been a good parent — GM left EDS alone to pursue its business objectives — the relationship hamstrung EDS in many ways. There were clumsy issues about trying to negotiate million-dollar mergers and acquisitions while dealing with "alphabet" pseudostock (GME) that GM set up for the EDS unit. EDS even had to back off from certain agreements because the resultant debt ratios would have had a negative impact on bond ratings for other GM businesses.

These complex financial hurdles were clearly outside EDS' control or influence, and they kept EDS from living up to its own high expectations.

GM last year gave EDS a precious gift — although, I wonder how many recognized it as such at the time. GM's pension fund had been seriously underfunded, so the company moved more than $6 billion of EDS' GME shares into the fund. Company officials hoped the class E shares would breathe some life and growth into the fund. What this seemingly innocuous financial transaction did was change the balance of power for
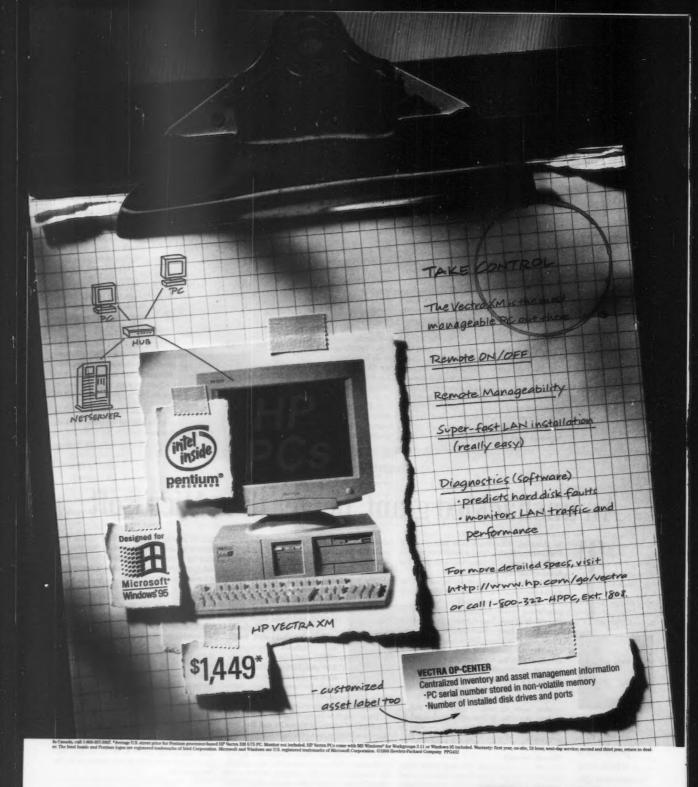
EDS in its relationship with GM. Almost overnight, it became glaringly obvious that what was good for EDS was very good for GM. Now EDS had a powerful tool with which to begin its flight to freedom and independence.
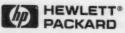
EDS early in April appointed a new, post-spinoff board of directors. Heavyweights such as Robert Kidder, CEO of Borden, Inc., and former Bush administration officials James Baker III and Dick Cheney, will now help EDS navigate its way as a stand-alone corporate entity.

This is the first sign of an in-your-face, highly visible EDS poised to raise its profile as a technology powerhouse. Fairly soon, we'll see the rollout of an estimated $30 million Madison Avenue image campaign for EDS. Once EDS' britches catch up with its size, and the stock bounces back from the initial hits it will invariably take as the company extricates itself from the body of GM, I predict we'll see EDS make a major move regarding a strategic acquisition or a joint venture.

The scale or importance of that transaction will have long-lasting effects on the technology market. It might even write a new chapter of the Information Age.

Scrupski is a consultant at Technology & Business Integrators, Inc. in Woodcliff Lake, N.J., and editor of the industry newsletter "IT Services Letter." Her Internet address is scrupski@tbicentral.com.

RDI Computer
announces PowerLite
ExtraView, 42

Servers & PCs

Users stick with low end of Unix line

By Craig Stedman

Unix servers keep getting bigger. But many users continue to think small.

Though vendors brag about beefing up their Unix hardware to enterprise proportions, a half-dozen customers said they would still rather spread their applications across multiple low-end or workstation-class servers. The increasing reliability and scaling of high-end servers doesn't negate the advantages of distributing workloads, those customers said.

"Big machines are nice if you're not concerned about your users," said David Pensak, head of computer science research at Du Pont Co. in Wilmington, Del.

Limited impact

To minimize the number of users affected by the failure of a particular server, Pensak's department has shied away from IBM's RS/6000 multiprocessors and instead targets single-CPU machines at specific workgroups.

"If I've got six separate servers for six groups of users, a system crash

isn't as big of a deal," he said.

Reducing the risk of widespread user outages was also high on the list of other information systems managers who don't want to gamble that a big box will stay up. Another key benefit that small machines provide is the ability to make changes quickly as business needs dictate, they added.

That kind of flexibility was the main reason CNA Insurance Co.'s Personal Lines division opted to off-load its mainframe-based policy administration application to 10 pairs of clustered Hewlett-Packard Co. servers rather than a single high-end HP system.

"If we decide that we need to do our California processing in California, we can just pick up [that region's] system and move it," said Dwight Wolfe, manager of Unix systems at the Chicago-based division. "We don't have to take a massive server with 12 processors and try to figure how to take that [workload] off of it."

Hardware cost is a more variable issue. Pensak said big RS/6000s are

Unix systems

Intel hardware challenges Unix

By Bob Francis
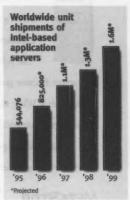
Corporate buyers are taking a closer look at multiprocessing PC servers as prices drop and functionality increases.

Many corporations that stuck with Unix-based multiprocessing servers for applications in the past are now considering servers outfitted with up to four Intel-based processors. At the same time, these users are also checking out lower-end Unix systems, which have dropped in price to meet the PC server competition (see story at left).

"We're looking at Windows NT servers for applications where we wouldn't have considered them before," said Anthony Flora, senior vice president at NationsBanc Services, Inc. in Richmond, Va., the information systems arm of NationsBank Corp. in Charlotte, N.C. The bank currently uses systems ranging from IBM mainframes to Alpha servers from Digital Equipment Corp. But advances at the high end of the PC server market have led the bank to finally look at PC servers.

Worldwide unit shipments of Intel-based application servers

'95	'96	'97	'98	'99
544,076	835,000*	1.1M*	1.3M*	1.6M*

*Projected

Source: International Data Corp., Framingham, Mass.

It isn't alone. According to International Data Corp. (IDC) in Framingham, Mass., Intel-based multiprocessor superserver sales increased 152%, from 50,300 units in 1994 to 127,000 in 1995.

Two recent developments are likely to fuel more growth this year. First, Intel Corp. is pushing its high-

IBM extends data storage management support to NT

By Jaikumar Vijayan

Starting in September, IBM will add Windows NT server support to its Adstar Distributed Storage Management (ADSM) software.

ADSM is IBM's enterprise-wide storage management product that integrates unattended network backup and archiving with storage management and disaster recovery.

Apart from customized data backups and archiving, the key storage management capability that ADSM will include in the NT space is an intelligent incre-

mental backup feature that backs up only new data or changed files, reducing backup time and network traffic. The software also features a business recovery capability for backing up the ADSM database and client data to a secondary site.

"The product is going to have the look and feel of Windows NT, with the full functionality of an enterprise storage management platform," said

Functions of ADSM

■ Automates data backup and archiving

■ Provides disaster recovery planning

■ Provides a point-and-click interface for data recovery

■ Supports a variety of vendor workstations, PCs, LAN file servers and communications protocols

Lisa Haut, IBM's product marketing manager for ADSM for NT.

What sets ADSM apart from other storage management products is the wide range of

platforms and mixed-computing environments it supports, said Rob Enderle, an analyst at Giga Information Group in Santa Clara, Calif. ADSM "is the only distributed storage management product that scales all the way from a PC LAN to a mainframe," he said.

"We've found that ADSM servers for the most part are transparent between platforms," said Kristie Reid, a senior systems engineer at Wes-

tinghouse Electric Corp. in Pittsburgh.

"Not too many other products offer the kind of integrated space management and backup" that Westinghouse was looking for, she said. The company plans to use the NT product to locally manage and back up NT servers at several of its smaller sites.

Other vendors with similar products include Legato Systems, Inc., Seagate Technology, Inc. and Cheyenne Software, Inc.

Pricing for IBM's product wasn't available.

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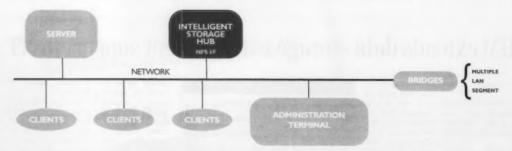
The solution to managing data across large networks isn't as simple as adding disks, or even buying a new server. Because general-purpose file servers are not optimized for centralized network storage. Our intelligent storage hub is. While storing up to 252 GB, it enables you to support more users and reduce response time. It eliminates bottlenecks, automatically backs up and restores, conserves network resources and controls costs.

How is all this possible? Simple. Everything about the MetaStor SH4000 intelligent storage hub is dedicated solely to worry-free storage. There's no excess code, no traditional speed bumps like virtual memory or application interfaces. It's

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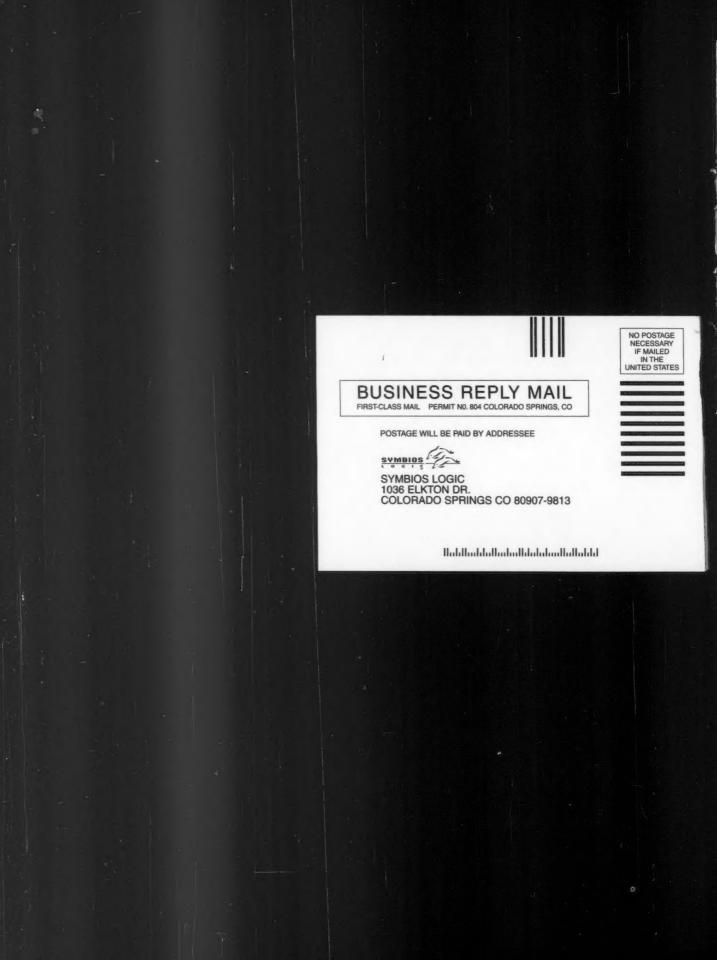
The demand for centralized storage with blazing I/Os has never been greater. And the solution has never been clearer. Or more affordable. The MetaStor SH4000 intelligent storage hub, relief for the storage-hungry masses. To learn more, call Symbios Logic at **1-800-86-ARRAY,** or visit our Web site at http://www.symbios.com.

*The MetaStor intelligent storage hub attaches directly to your network, increasing data throughput by up to **50 percent.***

SYMBIOS
L O G I C
The Storage Connection

Intel hardware challenges Unix boxes

CONTINUED FROM PAGE 39

end Pentium Pro processors into the superserver arena by providing manufacturers with server motherboards — the basic building blocks of these servers. Companies such as Dell Computer Corp. in Austin, Texas, will use these motherboards for their line of four-processor servers later this year.

Second, Microsoft Corp. in Redmond, Wash., is aggressively pushing Windows NT into the corporate market via alliances with systems vendors such as Compaq Computer Corp. in Houston and strong integration with the company's office application suite.

A double take

Those two factors signal to corporate buyers that these servers are worth a second look for new applications, according to Jim Garden, an analyst at Technology Business Research, Inc. in Hampton, N.H.

A third factor may be the Internet. Analysts expect Internet application servers to meet a growing demand throughout the year. IDC estimated 13,500 Intel-based

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Down to size

Running multiple small Unix servers vs. a big central system

Pros:

- Small servers can be tailored to individual applications or departments

- Upgrades and application changes are easier

- Fewer users are affected when a small server crashes

Cons:

- Heavy transaction workloads may need a big server and a single database

- With small servers, there are more systems to manage and support

- Isolated pockets of unused capacity may appear on small servers

---

Internet servers shipped last year. Although the company hasn't yet estimated shipments for this year, it predicted that by 2000, 425,000 Internet servers will ship annually.

Despite this rosy outlook, there are still some areas where traditional Unix-based systems have

---

the upper hand on PC servers, Garden said. "There's a tremendous amount of service, support and systems management infrastructure that has been built up in Unix and minicomputer systems over the years, and you don't recreate that overnight," he said.

Some PC server vendors are grappling with those challenges directly, creating links between servers and systems management software. IBM, for instance, is tying its Tivoli Systems, Inc. PC SystemView closely with its servers, while Hewlett-Packard Co. has links with its OpenView platform. Compaq has inked deals with a variety of systems management vendors, including Tivoli, BMC Software, Inc., Boole & Babbage, Inc., Cabletron Systems, Inc. and Seagate Enterprise Management Software, Inc.

Those ties paid off recently when Compaq nailed its largest server deal ever — to supply General Motors Corp. in Detroit with 8,500 servers. According to Marvin Kay, GM's manager of dealer information management, one reason Compaq sealed the deal was because it demonstrated the systems management capabilities of its servers.

Low end

CONTINUED FROM PAGE 39

"way overpriced" compared with buying a bunch of smaller machines. Au Bon Pain Co., a restaurant chain in Boston, also saved money by spreading most of its home office processing across five Sun Microsystems, Inc. workstations.

The workstation-class boxes cost a total of about $100,000 when Au Bon Pain made its purchase a couple years ago, said Michael Georgy, the company's technical services manager. A single Sun server with equivalent memory and disk capacities would have cost another $70,000 or so, he added.

On the other hand, Wolfe said, the distributed hardware that CNA buys will probably end up costing more than a single high-

> "A lot of [Unix server vendors] still believe that they have to replace a mainframe with a mainframe. [But a server of that bulk is needed in] a much smaller range of industries than people had thought."
>
> — *Terry Bennett, consultant, Portland, Ore.*

end server would have because the insurance company uses relatively beefy midrange systems in its clustered pairs. But the benefit of being able to separate processing on a regional basis outweighed the potential extra cost, he said.

Data warehouses and big transaction applications in vertical markets such as financial services may need the size and power of a monster server, analysts said. Going with multiple small servers also poses integration and remote management challenges for IS.

But relying on an enterprise server would be too much "like going back to mainframe days," said Hugh Allan, database manager at Dunlop Tire Corp. in Amherst, N.Y. Dunlop is migrating from big iron to a network that mixes medium-size and workstation-class Sun servers.

"This is a much less risky architecture," Allan said.

RDI Computer Corp. has announced PowerLite ExtraView, a SPARC-based portable PC.

According to the Carlsbad, Calif., company, PowerLite Extra-View has a 12.1-in., 1,024 by 768 dot/in. active-matrix display with 4,096 colors and 16 gray scales. It was designed for geographic information systems, computer-aided design and manufacturing and software demonstration.

PowerLite ExtraView has a 110-MHz MicroSPARC II processor, up to three 1.2G-byte 2½-in. hard disk drives, memory capacity of up to 128M bytes, a fax/modem card and a floppy drive or PCMCIA. It weighs 7½ pounds.

Pricing for PowerLite Extra-

View starts at $12,995.
▶ *RDI Computer*
(619) 929-0992
www.rdi.com

Sony Electronics, Inc. has introduced CSD-880E, an eight-speed CD-ROM drive.

According to the San Jose, Calif., Sony Corp. division, CSD-880E features a robust spindle motor to minimize vibration and optical pickup with expanded frequency bandwidth. It was designed to use little CPU processing power to increase system performance.

The product has a data transfer rate of 1.2M byte/sec. to support MPEG-2 video and includes a 256K-byte buffer. It comes with an interface card and audio cable. CSD-800E costs $190.
▶ *Sony Electronics*
(408) 432-0190
www.sel.sony.com

IBM has announced new models of the 8235 Dial In Access to LANs (DIAL) servers.

The DIAL Model 051 is for Token Ring networks; Model 052 was designed for Ethernet networks. According to the Armonk, N.Y., company, both models were designed for small offices that need no more than two simultaneous connections. Each has two

ports and can be configured with external analog modems or terminal adapters for Basic Rate Interface Integrated Services Digital Network (ISDN) connections. The 8235 Model I40 is intended for large central sites with hundreds of dial-in users. It integrates all the functions of ISDN and analog remote access, communications server and remote routing in a single box. It supports individual modems and aggregated connections.

The three models let customers use standard dial-up phone lines or digital networks to re-

motely access LAN resources.

Model 052 costs $1,899, and Model 051 costs $2,399. Model I40 will be available in August, with pricing starting at $20,700.
▶ *IBM*
(914) 765-1900
www.raleigh.ibm.com

Product shorts

Sharp Electronics Corp. has introduced a multifunction printer/fax/copier desktop machine, Model F-2700M. As a laser printer, it features the Windows Printing System and 512K bytes of

standard memory that can store up to 39 pages. It has multitasking capabilities that let users print while sending or receiving faxes. The fax machine has fax broadcast features that let users send one document to 50 locations simultaneously. Cost: $1,249. Sharp Electronics, Mahwah, N.J. (201) 529-8948. ... **Hertz Computer Corp.** has announced a line of World Wide Web servers. Configurations range from a basic Windows 95 server to a higher-end Windows NT server. Pricing starts at $3,000. Hertz Computer, New York, N.Y. (212) 684-3658.

Godzilla goes NFS

Network Appliance, Inc., a Mountain View, Calif., maker of dedicated Network File System (NFS) storage servers, has introduced a high-end model that can support up to 300G bytes of disk space. Code-named Godzilla, NetApp F540 starts at $52,950 without any disks. Network Appliance said it also plans to add support for Windows NT and Hypertext Trans-

port Protocol files to its servers this summer.

Phones to access 'net

Nortel, Inc. plans to turn its screen-equipped Power-Touch telephones into Java-based devices for accessing the Internet. The beefed-up phones will use Java-specific chips that are being developed by Sun Microsystems, Inc., the owner of the Internet programming language. Business, home and wireless applications are planned, and customer trials are expected to start next

year, Nortel said.

StorageTek names new leader

Storage Technology Corp., a maker of information storage and retrieval systems, has a new CEO, president and chairman of the board — David E. Weiss. Weiss will succeed Ryal R. Poppa, who is retiring after 11 years at the helm of the company. Weiss has been climbing the StorageTek corporate ladder since his arrival in 1991, after a 23-year stint with IBM.

Time. To do your job. To think. To actually take lunch. With Lotus Approach,° time is what you'll be giving the entire MIS department. Because Lotus Approach is a powerful, easy-to-learn database that enables end users to manage and analyze corporate information on their own.

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On their own? And I get
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Software

Video on Windows

Nonlinear editing systems used for video editing were on display at this year's National Association of Broadcasters conference in Las Vegas. Here is a breakdown of them by platform supported:

Platform	New system	Already available	Total
Windows	55	32	87
Macintosh	10	19	29
SGI	12	11	23
Other (Amiga, etc.)	16	13	29
Total systems	93	75	168

NT vies for star role in video editing

By Lisa Picarille

Microsoft Corp. is staging an aggressive bid to help Windows NT land the plum role as the video editing platform of choice.

Not content for it to be typecast in corporate environments, Microsoft turned in a stellar performance with NT at a recent broadcasting trade show. The traditional marquee stars in this field are the Macintosh and high-end workstations from Silicon Graphics, Inc. (SGI).

At the National Association of Broadcasters conference held in April in Las Vegas, 93 nonlinear editing systems were unveiled. Fifteen of those were NT-based, 10 were based on the Macintosh, and 16 were centered on SGI wares (see chart).

"NT is definitely making very significant inroads in the video editing market," said Bob Turner, a Scituate, Mass.-based contributing editor for *Videography* magazine. He said several major video software developers, including Avid Technology, Inc., demonstrated NT versions of their popular editing systems at the broadcasters conference.

Supports many platforms

Analysts attribute NT's rise in video editing to its ability to run on both Intel Corp. and RISC platforms. Six of the 15 new NT systems will run on Digital Equipment Corp.'s Alpha chip.

In addition, the 32-bit multiprocessing capabilities of NT make it ideal for the processor-intensive task of editing video on the desktop, said Ken Geary, a multimedia specialist at Ademco Corp. in Syosset, N.Y.

"It was a natural to use Windows NT. Most of our clients are on Windows, and using NT puts me in a good position as a producer because I don't have to worry about translating files," said Lee Wojnar, president of Wojnar Productions, Inc. in Philadelphia.

One video producer said NT is gaining momentum.

"There is no longer a prejudice that the Mac is better for video," said a California-based independent video maker, who asked not to be named. "Editors just

Strong Affinity

Users laud Digital plan to integrate NT, OpenVMS

By Jaikumar Vijayan

Digital Equipment Corp. is speeding up the rollout of products and services to help OpenVMS customers integrate Windows NT more easily.

At the recently concluded Digital Equipment Computer User Society (DECUS) conference in St. Louis, for instance, Digital laid out a road map for products scheduled to be released later this year. The company did this even as it was busy rolling out a range of products for users of both operating systems [CW, June 3].

The Maynard, Mass.-based company's plan (see chart) is good news for users, such as the Australian Stock Exchange, that are rolling out mixed OpenVMS and Windows NT environments, said Gerard Smyth, a systems architect at the stock exchange in Sydney.

"The mission-critical part of the system will continue to be on VMS," Smyth said. But for the broker systems at the front end, "we felt that Windows NT was the operating system of choice. Any program that eases software migration between

What's next for Digital's Affinity program

Windows Product Suite	Provides gateway required by Windows NT desktop users to access existing data on OpenVMS
Continuous computing	Enhancements to OpenVMS, including high-availability clustering
Transaction processing	Distributes transactions between OpenVMS and Windows NT

Lotus rounds up partners

By Tim Ouellette

Lotus Development Corp.'s growing posse of Notes-related business partners is a sign to Notes users that their investment is still on strong footing.

From a base of 12,000 third-party vendors earlier this year, including developers, integrators, trainers, consultants and resellers, Lotus expects to have 20,000 channel partners by the end of the year.

While users seem confident, the number of partners can seem overwhelming, said John Hodge, chief information officer at NAC Reinsurance Corp. in Greenwich, Conn. "When you look back three or four years ago, it was difficult to find Notes-based products," he said.

Any downturn in the huge channel that Lotus depends on to install and improve Notes could make users look seriously at World Wide Web-

based intranet technology.

"We do see some customers making hard choices now" between Web- and Notes-based applications, said Nina Burns, president of Creative Networks, Inc., a consultancy in Palo Alto, Calif. "There are some sales taken away from Notes, but there is even more opportunity to integrate Notes with the Web."

On the move

Lotus isn't sitting idly by as intranet-based products and groupware offerings from Novell, Inc., Microsoft Corp., Hewlett-Packard Co. and Oracle Corp. hit the market.

Next week at PC Expo, Lotus plans to hold a special business partner briefing to attract new firms to develop Notes software for Internet, messaging and Lotus Components features (see the Components review, page 50).

And a future Internet developer's conference is being planned around Domino — Lotus' Notes server that has native support for the Internet's Hypertext Transport Protocol — as the Web development tool.

Since Notes is more a development platform than shrink-wrapped software, users depend on third-party firms to customize it and provide applications that fit their needs [CW, Feb. 5]. And with Lotus pushing Notes 4.0 as an enterprise product, companies need more help than ever just to introduce the software to customers.

Noteworthy partners

A sample of Notes developers that have popular Notes applications

Type of software	Vendor	Product
Document management	Common Ground Software	Common Ground
Contact database	Symantec	Act for Notes
Administration	Brainstorm Technologies	Server Admin Plus
	CleverSoft	CleverWatch
Sales force automation	MFJ International	Overquota
Workflow	Onestone Information Technologies	ProcessWare Engine

If you're going to bury

Lotus Components improve on Notes

Suite of six applets adds functionality
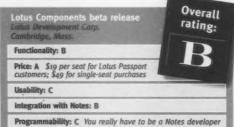
By Garrett N. Ray

Lotus Development Corp.'s soon-to-be-released Lotus Components makes it much easier to share information. And that, after all, is the whole point of using Notes in the first place.

Lotus Components gives users a standard way to embed charts, spreadsheets and project management templates in Notes documents. Until now, that has been nearly impossible to do consis-

template builder that lets Notes developers customize a component for a special need, such as building a standardized project scheduler for constructing month'y sales reports.

The template builder wasn't included in the initial beta release but was made available in the second beta version, which was delivered after this review was completed.

In the beta-test version of Lotus

PRODUCT REVIEW

Notes Rich Text Field (RTF), none of the applets is a substitute for full-fledged applications.

End users can manually add any Component to a Notes RTF from the Create Object menu or the Components panel. Developers have other options, which are mentioned below.

The Components spreadsheet supports an array of formulas and operators — such as SUM and AVG — and, as with all the Component applets, a bevy of formatting options. To exchange data bi-directionally with Notes document fields, one need only declare a cell as a named range and select an Exchange With Notes check box. Lotus/FX (file exchange) takes care of the rest.

uler entries can be exchanged with Notes data fields. The scheduler doesn't support resource management.

The remaining applications — charting, drawing and the file viewer — provide all the functionality one might expect from, say, a Windows 95 accessory program. That is, functional but rudimentary. But the applets can be fully integrated with Notes documents, and that is the main point for considering Lotus Components.

be used in non-Notes applications. For example, a Components schedule can be included in a Microsoft WordPad file.

It would be prudent to ask, "Is this another attempt to lock me in to a vendor's software suite?" The answer, quite simply, is yes. But it is a "yes" qualified by the near-giveaway prices of $19 per seat for Lotus Passport customers and $49 for single-seat purchases.

It is true that you will have to install Windows 95 or Windows NT to provide access to Lotus Compo-

Lotus Components beta release	Overall rating: B
Lotus Development Corp. *Cambridge, Mass.*	
Functionality: B	
Price: A *$19 per seat for Lotus Passport customers; $49 for single-seat purchases*	
Usability: C	
Integration with Notes: B	
Programmability: C *You really have to be a Notes developer*	

The best of the six applets in the Lotus Components *suite is probably the project scheduler*

tently because one never knows whether a document reader runs Lotus' 1-2-3, Microsoft Corp.'s Excel or something else entirely.

Lotus Components is a set of six ActiveX software applets: spreadsheet, chart tool, project scheduler, comment tool, file viewer and drawing/diagramming application. ActiveX is a conceptual successor to Microsoft's OLE.

Also designed into the suite is a

Components, all applets were fully consistent with the overall look and feel of Notes 4.x; we tested Components while using Notes 4.02. The applets support Lotus SmartIcons, Status Bars, InfoBoxes, task-sensitive menus, help and other enhancements. Because of this, the applets are all fairly easy and straightforward to use.

Yet even though each is a fully functioning, robust application that can be fully embedded in any

Top applet

The project scheduler is probably the nicest applet in the Lotus Components suite. It adds a simple yet functional application to Notes that it seems the entire software industry has ignored.

The scheduler uses the conventional task, date, duration and bar-chart representation for a project and is a simple way to provide accurate estimates for new or ongoing projects.

As with the spreadsheet, sched-

As mentioned above, developers can further integrate individual components into Notes applications and control them with Microsoft's Visual Basic and Lotus' LotusScript 3.0. Through the LotusScript capabilities provided by Notes 4.x, Components can be controlled programmatically via Notes Actions or built in to form designs.

Also worth noting is the minor bonus that Lotus Components can

nents, just as you will to run Lotus Notes 4.x. And your users might increasingly demand that the Notes development staff begin customizing applications around the Components applets. But this could be a small price to pay for adding needed functionality to Notes and your enterprise.

Ray is a writer and consultant in North Conway, N.H. His Internet address is gnray@nxi.com.

Client/server with a mainframe mentality

By Frank Hayes

Information Builders, Inc. (IBI) in New York has rolled out a client/server development system designed to help developers connect mainframe applications with servers, user PCs and the World Wide Web.

The tool set, named Cactus, is based on IBI's widely used Enterprise Data Access (EDA) middleware. But it adds graphical tools to let users build multitier client/server systems that may include legacy mainframe systems, Windows-based applications and Web sites.

Many development vendors are adding Web support to their tool sets, but most of these sets don't

meet the demands of corporate development shops for large, mainframe-oriented applications, users said.

The three Cs

"We wanted the care, custody and control you get from the mainframe, but we didn't want the application on the mainframe. And we didn't want the subtleties you run into with a pure client/server environment," said Jim Wells, chief information officer at Magee-Womens Hospital in Pittsburgh, which is using a beta version of Cactus.

"Symantec and Borland and

Gerry's Cactus Shop

Applications built with IBI's Cactus, *such as this one for a cactus retailer, have Web support*

other companies that come from the PC world don't have that mainframe mentality" focused on data integrity and security, said P. J. Matarese, a senior program analyst at Philips Electronics North America Corp. in

Sunnyvale, Calif.

Because Cactus is built on EDA, applications built with it can access mainframe services, including CICS transactions and IMS data, officials at IBI said.

Cactus also supports packages that use Microsoft Corp.'s OLE architecture, including Windows applications and high-end software from SAP AG and PeopleSoft, Inc.

The development system can also link back-end applications to the Web or to front-end interfaces built using Microsoft's Visual Basic, Sybase, Inc.'s PowerBuild-

er or other visual development systems. Support for generating applets written in Sun Microsystems, Inc.'s Java programming language will be added later this year, IBI officials said.

Using Cactus, applications are designed with a $3,250 workbench running under Windows or OS/2. But the applications can be partitioned so that parts run on Windows NT- or Unix-based servers.

"It allows you to break up your processing and integrate things in these different environments," said Valerie King, president of Logical Data Solutions, Inc., a developer in Bethesda, Md.

"We're going to be able to give users the Windows software they want but still allow the corporation to keep their data on the mainframe so they can maintain control over it," she said.

IBM's DB2 makes its mark with improved OLTP performance

DB2 for MVS 4.2 can handle growing databases

By Dan Richman

Critical performance boosts and greater capabilities in online transaction processing (OLTP) marked the debut last week of IBM's latest version of DB2 for MVS.

One user at the annual DB2 user group conference in Dallas last week said the new version of the relational database management system comes close to — if not even with — the robust OLTP performance of its venerable predecessor, IBM's IMS hierarchical database.

Earlier versions of DB2 for MVS 4.2 "don't handle big enough tables" and can't run 7 days by 24 hours," said Michael Siegal, president of Life Cycle Consulting, Inc., a data warehousing consultancy in Torrance, Calif. "From what IBM says, the new version can handle really big databases — up to 1T byte per table. It also allows online reorganization of databases, which is essential for running around the clock."

Part of the package

DB2 for MVS 4.2 also adds support for the following:
- Parallel query processing, which increases performance.
- The Open Database Connectivity and TCP/IP for Distributed Relational Database Architecture application programming interfaces, which opens DB2 to outside vendors' tools.

- Computer-aided software engineering statements in SQL, which tighten application code.

DB2 for MVS 4.2 is set to enter beta testing by year's end, but a shipping date hasn't been set.

IBM also announced a version of the

DB2 improvements

New in DB2 for MVS Version 4.2

Parallel queries
Online table reorganization
SQL CASE statements
ODBC and TCP/IP for Distributed Relational Database Architecture support

New in DB2 Parallel Edition Version 1.2

SQL CASE statements
Outer joins
Graphical, parallelized administration module
Improved query optimizer
Highly parallelized sorts
Query governor

DB2 Parallel Edition (PE), which adds features that should swell the ranks of users moving to that version, said Stewart Miller, president of Executive Information Services, a research firm in Carlsbad, Calif.

"As databases keep swelling, [parallel DB2] gets easier to cost-justify because it's increasingly more efficient than single-processor or symmetric multiprocessing DBMSs," Miller said. He said the parallel version, which runs only on IBM's SP2 massively parallel machine, can cost up to $1 million in hardware and software.

Performance boost

Version 1.2 of DB2 PE, which ships next month, gave overall performance increases of about 10% to beta tester Greg Leibman, chief data warehouse architect at Black Diamond Data Systems, Inc., a New York consultancy.

Despite new features such as an improved query optimizer, the parallel DB2 "still doesn't offer the full capabilities of DB2/2," Leibman said. DB2/2 is the implementation for uniprocessor and symmetrical multiprocessing machines under AIX, HP-UX and other Unix operating systems. DB2 PE 1.2 sacrifices some features for the sake of parallelizing those most essential to high performance, Leibman said.

Those shortcomings are due to be remedied in the next release, Version 3.0, which hasn't been announced yet but is set to ship by July of next year, said Gilles Fecteau, the product's main architect.

Affinity

these two platforms is welcome, he added.

The announcements are part of Digital's so-called Affinity program, which was announced last year. The program is aimed at allowing corporations to connect Windows NT systems to OpenVMS systems in a three-tier client/server arrangement.

Thus far, at least, Affinity "is playing well with the VMS installed base," said Chris Christiansen, an analyst at International Data Corp. in Framingham, Mass. "VMS still remains the production system of choice," but it is becoming clear to the VMS base that NT is the "hot new technology of the future," he added.

Catch the wave

For its part, Digital plans to ride the Affinity train for as long as it can. "We are going to be establishing a pattern of monotonous predictability here" as far as announcing and delivering Affinity products are concerned, said Wes Melling, Digital's vice president of OpenVMS systems.

As part of this exercise, Digital this fall will follow up on its recent Affinity product rollout with major enhancements to application development packages, transaction processing and messaging (see chart, page 47). Among the improvements will be "dramatically increased transparency of bidirectional data access" between OpenVMS and Windows NT, according to Melling.

Next year, a new storage server will debut. It will provide a pool of centrally managed, high-availability disk and file storage for Windows NT application servers. Also on the horizon are enhancements to Open VMS, including fiber channel and Asynchronous Transfer Mode as cluster interconnects. A Windows NT management station that provides cluster storage, batch job scheduling and console management tools is also scheduled for next year.
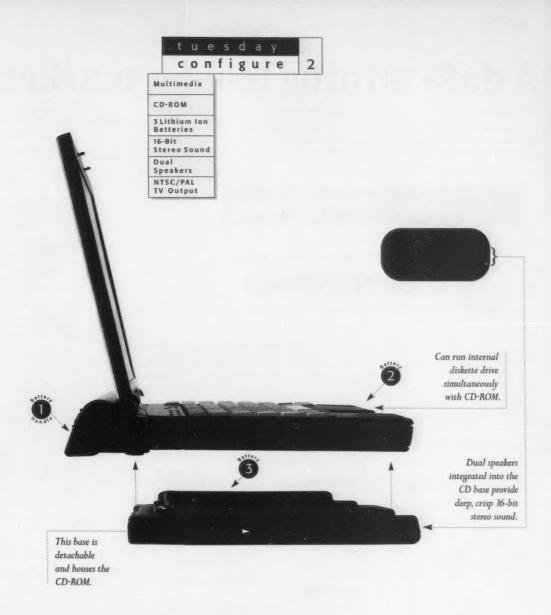
NT/OpenVMS integration

Other users welcomed Digital's continued rollout of its Affinity program but expressed concern that OpenVMS may be getting pushed aside in the process.

"NT could be a very useful and very dynamic operating system, but I am not certain in what way it will interact with VMS," said Brian Cutler, OpenVMS system manager at the State University of New York at Albany.

Multimedia

CD-ROM

3 Lithium Ion
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Dual
Speakers

NTSC/PAL
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1
Battery Handle

Battery
2

Battery
3

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A data mining tool for marketers

By Sharon Gaudin
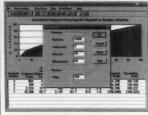
Pilot Software, Inc. has wrapped its new data mining tool in technology designed to find information and make business sense of it.

"Data mining is just coming out, and Pilot's release is going to be the first to integrate a data mining tool with other business intelligence applications," said Michael Joseph, an analyst at International Data Corp. in Framingham,

Mass. "That's hot stuff."

Pilot in Cambridge, Mass. — owned by The Dun & Bradstreet Corp. — is preparing to ship the Pilot Discovery Server, the data mining component to its Decision Support Suite. Discovery Server is scheduled

to ship late this month.

The server is aimed specifically at sales and marketing users, not statisticians and data mining experts, according to Paul Buta, product manager at Pilot. It is touted as being able to analyze a relational database, identify groups of customers who have similar characteristics and make predictions for those groups.

Pilot Discovery Server enables marketers to interpret results and produce models without the aid of statisticians

"Typically, they need to extract the information from the warehouse. When they do that, they make some assumptions about what data to extract. But often those assumptions are wrong," Buta said.

Stephen Huson, a business solutions manager at Lightbridge, Inc. in Waltham, Mass., beta-tested the Discovery Server. "With Pilot's product, the marketer can actually generate models and interpret the results," he said. With most data mining tools, the information systems department has to extract data, and then a trained statistician produces a model for the marketer.

Mining the vein

Red Brick Systems, Inc. is also coming out with integrated data mining. Red Brick Data Mine, to be built in to Red Brick Warehouse Version 5.0, is expected to ship Dec. 1.

David Folger, a program director at Meta Group, Inc. in Stamford, Calif., said Pilot's strength lies in its focus on a certain class of problems — marketing and sales.

For example, Huson said he uses Discovery Server to analyze turnover in the cellular telephone industry. "Pilot tells us which customers are most likely to defect [to another company] and why. That information helps us figure out how to keep more of them."

New Products

Logicraft Information Systems, Inc. has released FastCD Personal Edition, CD-ROM emulation software.

According to the Nashua, N.H., company, FastCD Personal Edition lets users run any Windows 95 or Windows NT CD-ROM application directly off a hard drive without a CD-ROM drive. It builds CD-ROM images by caching the entire contents of a CD-ROM in a container file on a local or network hard disk drive.

FastCD Personal Edition lets desktop users simultaneously run multiple CD-ROM applications off their local hard disk drives.

In networked environments, FastCD Personal Edition will let users access multiple CD-ROM applications off shared images stored on any file server or other PCs in peer-to-peer fashion. Users can access CD-ROM applications simultaneously. FastCD Personal Edition costs $25.
▶ *Logicraft Information Systems*
(603) 880-0300
www.logicraft.com.

Lotus Development Corp. has introduced Organizer 97, the latest edition of the company's personal information manager for Windows. According to the Cambridge, Mass., company, Organizer 97 runs on Windows 95 and Windows NT.

It has a multiaccess, multiuser database format that lets users schedule appointments, track to-do lists, maintain address lists and manage contacts.

Organizer 97 features flexible time management tools, full OLE and text formatting capabilities in Lotus NotePad and support for telephony application programming interface dialing.

It also includes World Wide Web icons for access to Lotus' Organizer Web site, the ability to launch a Web page from the Note-Pad and expanded support for international addresses.

Organizer 97 is compatible with Organizer 1.x and 2.x files. It costs $79.
▶ *Lotus Development*
(617) 577-8500
www.Lotus.com

RightFax, Inc. has introduced RightFax 4.5 for OS/2 and Windows NT, high-end fax server software.

According to the Tucson, Ariz., company, RightFax 4.5 for OS/2 and NT is a multitasking, multithreaded cross-platform enterprise fax server tool that lets users send and receive faxes directly from network workstations.

It was designed to take advantage of client/server architecture and enable all functions, including conversions, record maintenance and printing services, at the fax server level.

RightFax 4.5 for OS/2 and NT can be used in a variety of different environments, including Microsoft Corp.'s Windows NT Server, Novell, Inc. NetWare, IBM LAN Server and OS/2 Warp Server.

It includes support for Microsoft's Windows 3.x, Windows 95, Windows NT Workstation, DOS, Windows for Workgroups and OS/2 Warp clients.

Pricing for RightFax 4.5 starts at $1,495 for a server license for a single channel with unlimited users.
▶ *RightFax*
(520) 327-1357

CFM, Inc. has rolled out TeamFlow 4.5, process mapping software.

According to the Bedford, Mass., company, TeamFlow 4.5 combines deployment, organizational and Gantt charts with document management features.

It lets Lotus Notes users establish one-to-one connections among TeamFlow flowchart elements and individual documents in a Notes database.
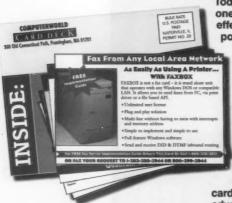
Users can access a Notes document without having to navigate through the Notes database structure.

TeamFlow 4.5 features include the ability to add text comments anywhere on the deployment flowchart to label lines, annotate work or add explanatory notes. It also allows the import and export of data between TeamFlow and spreadsheets.

TeamFlow 4.5 runs on Microsoft Corp.'s Windows 3.1, Windows 95 and Windows NT. It costs $295 for a single-user version or $1,350 for a five-user network license.
▶ *CFM*
(617) 275-5258
www.teamflow.com

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Apian Software, Inc. has unveiled Survey Pro 2.0, software for generating complete, integrated business, government and medical surveys.

According to the Menlo Park, Calif., company, Survey Pro 2.0 was designed for managers, business owners and consul-tants and lets them create surveys, analyze data and report results. It includes features for questionnaire design, database answer entry, management analysis and reporting.

Survey Pro 2.0 also includes drag-and-drop editing, point-and-click design specifications and WYSIWYG layout tools.

Survey Pro 2.0 costs $795.
▶ *Apian Software*
(415) 694-2900
www.apian.com

BookMaker Corp. has announced Surf 'n' Print, an Internet printing application that turns standard 8.5- by 11-in. pages into 5.5- by 8.5-in. digest-size booklets.

According to the Palo Alto, Calif., company, Surf 'n' Print lets any Windows 3.1 or Windows 95 user capture and print information from any World Wide Web site. The software reduces and paginates all the information and compiles it into a center-stapled or folded booklet. It inter-cepts standard-size pages on the way to any laser or ink-jet printer, reduces them and rearranges them into front and back sides.

A free 10-pack of Surf 'n' Print is available through BookMaker's home page. Unlimited-use versions cost $10.
▶ *BookMaker*
(415) 354-8161
www.clickbook.com

Brooktrout Technology, Inc. has announced Show N Tel 4.0 for Windows NT.

According to the Needham, Mass., company, Show N Tel 4.0 is a Windows NT-based client/server platform for developing and deploying voice, fax and telephony applications for an enterprise. It was designed for developers of telephony applications, including interactive voice response, fax-on-demand, desktop screen-pop and fax broadcast.

Show N Tel 4.0 features ActiveX controls and remote, multinode management and administration facilities.

Pricing for Show N Tel 4.0 for Windows NT starts at $995.
▶ *Brooktrout Technology*
(617) 449-4100
www.brooktrout.com

Sheridan Software Systems, Inc. has announced Sheridan Components Suite, three ActiveX controls.

Sheridan Components Suite comprises Calendar Widgets, Designer Widgets 2.0 and Data Widgets 2.0. According to the Melville, N.Y., company, the suite gives visual developers tools for developing front ends for database applications, along with specific widget and calendar components and features.

Data Widgets 2.0 includes advanced data-bound controls. Designer Widgets 2.0 features tool bar, notebook and index controls and tabs. Calendar Widgets is a set of components for visually displaying date- and time-related information in Windows-based applications.

Sheridan Components Suite costs $349.
▶ *Sheridan Software Systems*
(516) 753-0985
www.shersoft.com

Product short

Prolific, Inc. has introduced Snapshot/400 5.3, a performance tool for IBM's AS/400. It provides graphical, updated detail on many aspects of the AS/400, including CPU usage, number of users, disk utilization and average response time. Cost: starts at $995. Prolific, Arlington, Texas (817) 649-3223.

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Has It Changed Your Life Yet?

Users mixed on online buying

Many enjoy speed of the Internet but remain cautious

By Rebecca Sykes

Users' reactions to buying software over the Internet remain highly varied, according to customers at Comdex/Spring '96.

For some, there is simply no compelling reason to buy software over the Internet.

"I'm not dissatisfied with the way I get software now," which is through retailers or vendors directly, said Andrew Swiston, systems analyst at Arthur Andersen & Co. in St. Charles, Ill. "It's still just as easy to give [vendors] a call, [and] it gives you a break from staring at the computer."

But other users, including Rick Messinger, say purchasing software over the Internet is very convenient.

"You're surfing, and you find something cool, and you want to buy it, and — bing, bing, bing — there you go," said Messinger, information systems director at Compression, Inc., an Indianapolis-based maker of prototypes that range from sunglasses to fishhook removers.

Benefits of riding the wave

Messinger has bought between six and 12 applications on the Internet in the past year, all for his personal use. All the applications caught his eye while he was surfing at home. His recent purchases include several games and Internet software, such as Netscape Communications Corp.'s Navigator, Messinger said.

For other users, geography is the decisive factor, as they use the Internet to gain access to software unavailable to them through other channels.

"Most of the software I look for on the 'net is not for sale in Argentina," said Carlos Vazquez Varela, CEO of Sistemas S.R.I., a software developer in Buenos Aires. Within the past year, Vazquez Varela has bought four applications on the Internet, including

a hard-to-find printing utility he needed for a Hewlett-Packard Co. machine.

And for Vazquez Varela, the Internet is where he finds out about the software in the first place. "I wouldn't have known" about the printing utility without the Internet, he said.

The Internet helps some users get around their geographic realities, but other users remain constrained. In Saudi Arabia, would-be Internet users are held at bay by two prongs of a very strong fork: the lack of a telecommunications infrastructure and the Saudi Arabian government, said Marwan Bayoumi, MIS manager at Abudawood for Industry, a Jeddah-based maker of bleach.

Bayoumi hasn't bought software over the Internet because it is too expensive. There

is no number for dialing in to the Internet from within Saudi Arabia, Bayoumi said. Instead, users must place a call to another country to obtain "call-back" service, which lets them surf the World Wide Web from lines within that country, Bayoumi said.

The cost is around $3 per minute, which is only the beginning of the charges incurred by making purchases over the 'net, he said.

Instead of using the Internet, Bayoumi relies on his relationship with Clorox Co. in Oakland, Calif. — to which his company sells its bleach — to get access to some software, including Windows 95, Windows NT and Lotus Notes, he said.

Careful and concise

Several users who purchased software over the Internet said they did so cautiously and with a particular strategy in mind.

Messinger chose to make his purchases in stages.

"I'd buy something and watch my [credit-card] statements and make sure nothing [bad] was happening," Messinger said.

Security concerns are a large part of the reason Swiston doesn't purchase software via the Internet. "It still doesn't feel real secure," he said, noting the warning messages that accompany many transactions on the 'net.

But others, including Vazquez Varela, purchase software over the Internet despite their misgivings about security.

"The first time I did it, I closed my eyes," Vazquez Varela said. "Nothing [bad] happened, so I did it again."

Sykes writes for the IDG News Service.

NT vies for role

want to get the job done quickly, effectively and cheaply. It's no longer a religious decision; it's a business decision."

But the Macintosh is a tough act to follow. Macintoshes currently offer more built-in functionality — including onboard audiovisual processors, video output and video digitizing hardware — than their Intel-based counterparts, said Dan White,

senior product manager for Avid Technology's NT products.

Strong competition

In addition, Apple Computer, Inc. offers a line of audiovisual Power Macintoshes that include built-in digital-to-analog converters. The Mac OS also simplifies video integration with QuickTime, a system-level technology that provides a standard interface for dealing with video hardware and software across Macintoshes and Windows.

Video editing

Observers said the Macintosh's history in creative markets means there is a slew of third-party software for video editing, authoring and special effects.

Although some of those applications are also for Windows, Turner said he expects more video tools to be available for NT in the next year. He predicted that corporate users who already embrace NT will start demanding video-related features to incorporate video into presentations, memos and electronic mail that can be distributed over networks.

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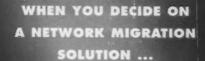
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The Enterprise Network

William Jewell College picks ATM for long-range needs, **68**

Merger mania hits home

By Bob Wallace

They are still concerned about the fast pace of mergers and acquisitions in the frenzied internetworking industry, but users like the end result — more complete and tightly integrated product lines.

"The best end result of a merger or acquisition is when a company can quickly extend, or plug a major hole in, their product line with minimal disruption to users," said Blair Sanders, a senior member of the technical staff at Texas Instruments, Inc. in Plano, Texas.

That means users can get new and innovative products that don't require costly upgrades, are interoperable and are backed by solid service and support, Sanders said.

The number and median size of mergers and acquisitions in the internetworking industry has risen from 17 mergers worth $8.6 million in 1992 to 30 mergers worth $48.8 million last year.

Cisco Systems, Inc. is leading internetworking's Big Four, with nine mergers and acquisitions to date. A 10th, StrataCom, Inc., is due to be approved soon. 3Com Corp. is second on the acquisition trail, and Bay Networks, Inc. — which was itself formed by a merger — is third.

Internetworking mergers and acquisitions

BEST

- **Extends a vendor's product line**
- **Speeds the integration of key technologies**
- **Faster than developing products internally**
- **Companies can offer new technologies faster**
- **Builds stronger vendors**

WORST

- **Vendors will not have a clear technology direction**
- **Key products will be phased out**
- **Expensive upgrades will be needed**
- **Users' networking plans will have to be changed or scrapped**
- **User may have to switch to other vendors for networking needs**

Even the acquisition-averse Cabletron Systems, Inc., which hadn't bought anything heading into this year, earlier acquired the switching division of Standard Microsystems Corp. and has announced plans for second and third buyouts. It will fork out more than $250 million for a remote access vendor and an adapter card vendor.

Not always welcome

Mergers and acquisitions often wreak havoc on users' networking plans.

"They put a tremendous amount of pressure on IS managers by continually forcing them to look at the potential resulting products and determine what they could do to existing network plans," said Bill Horst, chief at the General Services Administration's communications branch in Philadelphia.

Horst said information systems managers should gather as much information as they can on a merger, get the vendors to disclose the financial details, find out what product lines will be saved and/or cut and determine if any upgrades will be required. "The goal is to have them tell you if and how they think the deal might impact your networking

plans," he said.

The best-case scenario is when a user firm does business with each of two companies that merge, according to one large user.

"We felt very comfortable when SynOptics and Wellfleet decided to merge, largely because that means we'd see integration of routing and hubbing technology and in part because we'd have one less large company to deal with," explained Bob Spahn, a telecommunications specialist at Entergy Services, Inc. in Gretna, La.

Like many users, Entergy, the nation's fourth-largest electric utility, uses Wellfleet Communications, Inc. routers and SynOptics Communications, Inc. hubs. Bay showed a lot of foresight by acquiring network monitoring power Armon Networks, Inc. this year in a move that expanded its overall product line, Spahn added.

Don't rule it out

Sanders had some suggestions for companies that are reticent about mergers and acquisitions.

"Vendors need to avoid the 'it's got to be invented here or it's no good' approach and look at every opportunity," Sanders said. "I think most vendors realize that developing products in areas they're not experienced in can take too much time, effort and money."

The upcoming release of OS/2 Warp will have Assistance Center, a utility that includes the following modules:

WarpGuide	Remote Support	AskPSP	Problem Determination Folder
Contains artificial intelligence. Provides appropriate level of support – from beginner to advanced – for many tasks.	Allows IBM service representatives to troubleshoot by dialing in to users' systems.	An expert systems-based tool that contains a database of frequently asked questions.	Tools for LAN administrators to monitor network and processor performance.

OS/2 gets symmetrical

Merlin to feature network management, four-way SMP

By Laura DiDio

IBM will add network management features and multiprocessing support to the next version of its OS/2 Warp operating system.

The four-way symmetrical multiprocessing (SMP) support would boost OS/2's speed by 200% to 300% compared with OS/2 2.11, IBM executives said at the recent Comdex/Spring '96.

The standard SMP support will let OS/2 Warp users parcel out processing among two to four servers. Users will also be able to buy optional support for four more processors — for maximum SMP support for up to eight processors. This equals the support from rival

Web gives facelift to network management

By Patrick Dryden

The World Wide Web is changing the face of software for managing distributed networks, systems and applications. Next quarter, users should see reusable, mix-and-match modules that can spread the management workload throughout a network and that won't require vendor-specific interfaces.

Management tools

As a first step, many administrators and vendors are broadening access to management information by using Hypertext Markup Language to post reports on Web servers. That would let operations staff, field supporters and even users monitor status or performance of any machine with a browser instead of the Unix client/console typically required by a specific tool.

Network managers have experimented with ways that they can post trend reports on intranets at Chevron Information Technology Co. in San Ramon, Calif., and Sprint Corp. in Westwood, Kan. But they said they seek more — a standard way to manage devices from a browser.

"Java looks like the way to go," said T. X. Ho, senior communica-

"Funny,

I thought my

job description

said

MIS manager

not

test pilot."

The Enterprise Network

William Jewell gives ATM the college try

By Kim Girard

When William Jewell College in Liberty, Mo., began planning a network upgrade in 1994, the networking staff weighed the options: upgrading to Fast Ethernet or taking a complete turn to ATM.

Though it meant learning a new technology, the college picked Asynchronous Transfer Mode (ATM), a scalable high-speed packet-switching technology that transmits variable-size frames of data.

ATM's huge 155M bit/sec. bandwidth capacity will be tapped to let students sit in on classes while they are studying abroad or to check in with teachers via video while doing an internship in Washington, for example. With ATM, the college can run multiple video applications at once without slowing down the network, said Larry Dickerson, director of the college's computer services and networking.

But for Dickerson, the decision to implement ATM has not come without doubts. For one, Fast Ethernet would have been a cheaper, easier upgrade and is now a much more mainstream technology.

> "I wanted to have a high enough transmission medium for five years down the road."
>
> *Larry Dickerson,*
> *William Jewell*
> *College*

"A lot of companies are starting to build Fast Ethernet hubs," he said. "In retrospect, Fast Ethernet would have seemed more of the option to go with."

But overall, both Dickerson and network manager Doug Hawley agreed that for the college's burgeoning video and distance learning needs, an ATM backbone was the better long-term choice. The goal is to connect a 1,700-node network encompassing all major campus buildings. All students will eventually have the capability to connect to the network from dorm rooms, Hawley said.

"I wanted to have a high enough speed transmission medium for five years down the road," Dickerson said. "I wanted video and high-capacity graphics transfer."

"Fast Ethernet is cheaper, but ATM is very hot," Hawley added.

William Jewel College chose an ATM network to:

- Move traffic on the LAN or WAN
- Get 155M bit/sec. performance
- Transfer voice, video and data over a single line

"We're looking to be in a position there so we can take advantage of wide-area connections."

For the large-scale video needs often demanded in a college environment, ATM is definitely better than Fast Ethernet, said Beth Gage, a broadband consultant at TeleChoice, Inc. in Verona, N.J. Others have yet to be sold on the technology.

"The reason ATM is not thriving [overall] is there's just not a whole lot of use for it in the corporate arena yet," Gage said. "Corporate users don't want to go through the learning curve. They're doing frame relay. Someone needs to offer business solutions using ATM and show them how they can use the same infrastructure while gaining economies of scale."

William Jewell's existing network uses UB Networks' GeoStax stackable hubs and GeoRim Ethernet switches. The college is migrating to an ATM-based collapsed backbone using UB Networks' ATM switch, GeoSwitch/155, which provides dedicated 155M bit/sec. connectivity to each ATM-connected desktop or server.

Web gives facelift to network management

tions engineer at Chevron. "It promises a common interface across platforms so people can get and change information quickly and easily."

Ho and other network managers will get these kinds of wares from more than a dozen vendors that pledged recently to build applets based on the Java Management application programming interface (API).

SunSoft, Inc. officials said the company plans to offer the API and Java tools this fall in a kit called Solstice WorkShop and then provide applets next year for remote interaction with all its management software.

Officials at other vendors pledged to deliver applets as soon as the third quarter.

With such a cohesive environment for tools in place, administrators will get the data integration that vendors haven't been able to achieve through the Simple Network Management Protocol (SNMP), said John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo.

"The Web will be the integrator for all the tools," McConnell said. "The time of the SNMP platforms is past."

Stunted growth

SNMP platforms, such as OpenView from Hewlett-Packard Co., never evolved into their intended role as the unifier of all tools. "You won't need a common data repository because the applets will get the data and put it together for you," McConnell said.

As a result, SNMP platforms

will become much less important, though still needed for discovering network devices and managing events, McConnell predicted.

The Java API will spur more vendors to ship devices and systems with management objects that other vendors can use, said Peter Norwood, strategy director at the Tivoli management division of IBM.

That means enterprise management vendors won't have to develop interfaces to work with specific elements, such as a router, hub or database, Norwood said. They can just invoke the Java Management API to apply their policies to configure hundreds or thousands of targets.

"In the old way of thinking, the management console was a platform-specific way of looking at a management database. Now the browser user interface gets information from distributed objects everywhere," Norwood said.

Eventually, vendors may not have to supply consoles at all, said Blair Sanders, senior member of the technical staff for managing the global network at Texas Instruments, Inc. in Dallas.

"Then we can do everything through Web browsers instead of client consoles and X Windows sessions," Sanders said. "Each management server will become a black box in the background for CPU-intensive activity like event correlation and network mapping, while the interactive functions would move to applets."

Briefs

Candle shines on MQSeries
Candle Corp. this summer plans to expand its management software for IBM's MQSeries messaging middleware by adding support for the AIX and OS/2 versions. Candle Command Center for MQSeries now supports only the mainframe release. Agents for the Windows NT and HP-UX versions of MQSeries are also due by year's end. The Santa Monica, Calif., company also plans to start reselling MQSeries.

HP probes WANs
Hewlett-Packard Co. has adapted its NetMetrix LAN monitoring tools to help managers of wide-area networks examine the performance of their internetwork links. The NetMetrix WAN line includes probe devices that can watch traffic across frame-relay, packet-switched and point-to-point router connections. Prices range from $3,300 to $7,200, depending upon speed and number of circuits. The monitoring and reporting software runs on Windows 95 or Windows NT and costs $4,995. It integrates with HP's OpenView and other network management platforms.

Ascend switches up
Ascend Communications, Inc. in Alameda, Calif., has expanded its Max WAN switch product line. The line now includes two high-end products, the Max 4002 and Max 4004. The new switches let users choose the options needed initially and then add options later as necessary. The Max 4002, with two or four T1/PRI ports that support up to 48 analog/digital sessions, will cost $11,000, and the Max 4004, with four T1/PRI ports that support up to 96 analog/digital sessions, will cost $15,500.

Semaphore signals
Semaphore Communications Corp., a Xerox-supported venture, has released tools to prevent eavesdroppers from sampling LAN data sent across WANs via frame-relay links. Network Security System for Frame Relay provides five centrally managed services, including data integrity and data confidentiality. A hardware-based encryption engine supports major public key and private key algorithms and can transmit encrypted data at speeds up to 2.048M bit/sec., according to the Santa Clara, Calif., company.

Management applets

PROS

Power: Java programming language enables more remote interaction than text-oriented HTML	
Flexibility: Applets can run on any platform, and they allow custom reporting	
Support: Standard interface eases interoperability	

CONS
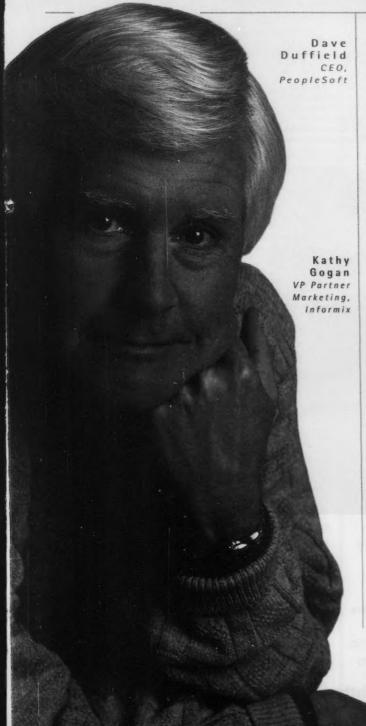
Complexity: In-house developers must master another language, and network managers must support another management standard	
Overhead: Extending management to browsers can boost network traffic and server utilization	
Security: Authentication required to limit applets' ability to affect key business systems	

Powerful Relationships Begin With Strong Family Values.

OS/2 gets symmetrical

Microsoft Corp.'s Windows NT Server platform.

The improvements — for both the server and workstation versions of OS/2 Warp — are due in the second half, the IBM executives said. Pricing hasn't been set yet.

OS/2 user Ray Pratts, senior technical analyst at Variable Annuity Life Insurance Co. in Houston, said the new tools are "vital. Anything that simplifies my management tasks and saves me time is a real boon."

Pratts said SMP support for OS/2 Warp Server is also crucial. "SMP will let us attach more clients to each server. That makes for more efficient and quicker network management, which will cut my work-

Numbers game

OS/2 has an installed base of 750,000 servers, according to Forrester Research statistics.

load immensely" because it will eliminate the need to manage so many individual clients, Pratts said.

Answering the NT challenge

Analysts said the features are part of an on-going IBM initiative to jump-start momentum for OS/2 in the face of soaring demand for Windows NT Server and Windows NT Workstation software.

IBM shipped 6 million copies of OS/2 Warp last year and will ship roughly 8 million copies of OS/2 Warp this year, a spokesman said.

But Windows 95 and NT are the only operating systems that will gain market share this year, according to Dataquest, a market research firm in San Jose, Calif. Windows NT Workstation is expected to ship 8 million units this year, and nearly 63 million copies of Win 95 will ship, Dataquest said.

Nevertheless, IBM continues to add enhancements to OS/2 Warp. One new network management utility is the Assistance Center. Through its graphical user interface, the Assistance Center helps walk even

nontechnical users through tasks such as configuring and installing printers and applications, said Jeff Howard, IBM's OS/2 Worldwide brand manager (see chart, page 65).

Bob Sakakeeny, an analyst at Aberdeen Group, Inc. in Boston, said the Assistance Center is a good idea. Centralizing key functions such as remote technical support and the WarpGuide assistant in a single utility eliminates many of the "hunting ex-

peditions" users engage in when they search the desktop for support utilities, Sakakeeny said.

Some analysts, however, said IBM will be hard-pressed to keep pace with Windows NT's momentum.

"Warp Server's new and improved technology is great," said Jon Oltsik, an analyst at Forrester Research, Inc. in Cambridge, Mass. "But it won't change the market realities: NT is on a roll."

New Products

Ipswitch, Inc. has announced WhatsUp, a personal network monitoring product.

According to the Lexington, Mass., company, WhatsUp lets network administrators, World Wide Web administrators and Internet service providers monitor any networked device on the Internet, corporate intranet or TCP/IP LAN. When a connection fails, the administrator receives an immediate alert via a desktop alarm, a pager or electronic mail.

WhatsUp can be configured to monitor multiple devices and was designed to check the status of any server, hub, router, printer or desktop computer with an IP address. It runs on Windows 95 or Windows NT.

Pricing for WhatsUp starts at $145.
▶ *Ipswitch*
(617) 676-5700
www.ipswitch.com

Secure Computing Corp. has announced BorderWare 4.0, a suite of third-generation firewalls.

According to the St. Paul, Minn., company, BorderWare 4.0 is a turnkey, plug-and-play firewall and Internet gateway system in a single chassis. It features advanced Virtual Private Network security, Secure Server Network enhancements and World Wide Web-based remote management functions.

BorderWare 4.0 includes comprehensive auditing and logging capabilities and dual-authentication functions.

Pricing for BorderWare 4.0 starts at $4,000.
▶ *Secure Computing*
(612) 628-2700
www.sctc.com

Micro Computer Systems, Inc. has announced Inetix Client for Windows 95 and

Windows NT.

According to the Irving, Texas, company, Inetix Client allows Novell, Inc. NetWare IPX/SPX clients to run 32-bit TCP Winsock applications without needing TCP/IP protocols on the client computers. It runs over Windows 95 and Windows NT IPX/SPX protocol stacks.

Pricing for Inetix Client starts at $995.
▶ *Micro Computer Systems*
(214) 659-1514
www.mcsdallas.com

LAN Innovations, Inc. has introduced Analyzer Companion 2.0, a Windows-based LAN analysis reporting tool that creates reports from a network analyzer's capture files.

According to the Colorado Springs company, Analyzer Companion 2.0 lets network administrators view packet data from within a capture file in graphic report form.

The product produces router reports, error reports, node reports and segment trend reports. Pricing starts at $595.
▶ *LAN Innovations*
(719) 575-0288

Product shorts

Cubix Corp. has introduced WorldDesk Commuter, a remote node alliance designed to serve as password authentication protocol and challenge authentication protocol security servers for Novell, Inc. and Microsoft Corp. networks. Its failure recovery feature reconnects and resumes interrupted or dropped sessions and picks up interrupted file transfers automatically. Pricing starts at $1,995 for six ports. Cubix, Carson City, Nev. (702) 888-1000. ... **SolCom Systems, Inc.** has rolled out 4-Port Ethernet Probe, a tool that lets network managers with multiple Ethernet segments in a single location manage up to four segments simultaneously. Price: $7,900. Sol-Com Systems, Reston, Va. (703) 758-6722.

THE WORLD WIDE WEB ● INTRANETS ● ONLINE SERVICES

The Internet

January 1995
Prodigy becomes first online service with Web access and adds browser to client software

April 1995
America Online and CompuServe add browsers to client software

May 1996
CompuServe says it's Web-bound

September 1995
Prodigy starts to migrate its contents to the Web

December 1995
Microsoft announces plans to move its proprietary online service, The Microsoft Network, to the Web

Online services offer Internet access and become

Web converts

By Mitch Wagner

When three of the four major online services say they plan to move their content from proprietary technology to the World Wide Web, it seems pretty simple — like moving a car down the road.

But in fact, it is a complicated process that involves the phased transfer of gigabytes of data from one format to another. And the results might not be apparent to most users for a long time.

Vendor plans

Officials at CompuServe, Inc., Prodigy Services Co. and The Microsoft Network (MSN) have said they plan to forgo the proprietary approach of their online services in favor of the Web.

America Online, Inc., the most popular online service, is the only holdout. It said it plans to continue with its proprietary software and, in fact, last week announced forthcoming upgrades.

The overwhelming majority of the online services' customers are consumers, not business accounts. But the online services' activities are significant to information systems managers because many businesses hope to use the online venue to attract consumers. And most of the consumers online — even on the Internet — got there through a proprietary online service.

Moreover, businesses that go online must decide whether to build a site for a proprietary online service or brave the open-standards wilderness of the Web.

"Online services are the Internet on training wheels," said Marvin Chow,

Proprietary puzzle

director of interactive marketing at Reebok International Ltd. in Stoughton, Mass., which has a site on the Web and is considering making the site available on CompuServe, America Online and MSN. "Also, there's a community on an online service. The Web is such a large, ominous place that you have a hard time building a community."

Each of the three Web-bound online services plans to move almost all its content to the Web by the end of the year. What the three will leave in the proprietary format is a small fraction of their services — though they are uncertain what that will be.

Pricing is also uncertain. When MSN goes on the Web, parent Microsoft Corp. plans a three-tier pricing structure, with some content that will be given away, other content that will carry

charges on a per-use basis and still other content available only for MSN subscribers, which now number 1 million. Officials at CompuServe, with 4.7 million members, and AOL, with 5.5 million members, wouldn't comment on pricing.

A third uncertainty concerns when the online services will ditch their proprietary client software. Theoretically, if all the online services were Internet-based, users should be able to use a single Internet package to access the 'net and all the online services. But the online vendors won't give a date when they plan to abandon their proprietary front ends. Online aficionados could use one software package for the 'net, another for CompuServe, another for MSN and still another for Prodigy well into next year or beyond.

Feds turn blind eye to systems security

'net links compromise sensitive data

By Gary H. Anthes
WASHINGTON

In the film, *The Net*, a hacker breaks in to a system at the Bethesda Naval Medical Center and changes the records of the Secretary of Defense to say he is infected with the AIDS virus.

According to Senate investigators, an official at the center admitted that a hacker easily could have done just that.

The security flaws are being patched, but the story spotlights a shocking lack of security in many sensitive government systems that are linked to the Internet. And many corporate systems are no more secure, experts said.

Most of the information about

cybercrimes is anecdotal, but "what is known about the potential threat is extremely disturbing," according to a report released recently by the Senate Permanent Subcommittee on Investigations.

"Technology provides a variety of 'bad actors' with innumerable methods and opportunities to disrupt our critical information infrastructure," according to the report.

Weakest spots
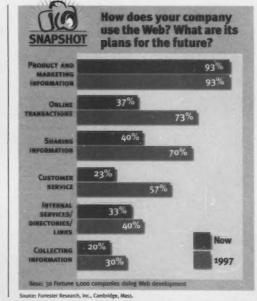
The committee said there are three broad areas of vulnerability: software and hardware weaknesses, human weaknesses and the lack of a security culture — or an awareness among users about the need for security.

As evidence of the cultural problem, the committee cited studies that demonstrate that just 4% of computer intrusions at the U.S. Department of Defense are detected by users. Of those incidents, only 27% get reported to the appropriate authorities.

But the solution isn't simply to

Computer attacks reported to the Computer Emergency Response Team (CERT)

Year	Attacks
1991	406
1992	773
1993	1,334
1994	2,341
1995	2,412

Source: CERT Coordination Center; Software Engineering Institute; Carnegie Mellon University, Pittsburgh

SNAPSHOT

How does your company use the Web? What are its plans for the future?

	Now	1997
PRODUCT AND MARKETING INFORMATION	93%	93%
ONLINE TRANSACTIONS	37%	73%
SHARING INFORMATION	40%	70%
CUSTOMER SERVICE	23%	57%
INTERNAL SERVICES/ DIRECTORIES/ LINKS	33%	40%
COLLECTING INFORMATION	20%	30%

Base: 30 Fortune 1,000 companies doing Web development

Source: Forrester Research, Inc., Cambridge, Mass.

Make your presence

intel inside
pentium

felt back at the office.

WebMate links database technology to 'net

By Mitch Wagner

WebMate Technologies, Inc. has launched World Wide Web server software designed to help companies improve the flexibility and speed of Internet sites by integrating the sites with database technology.

Conventional Web sites store their content in flat files, which are relatively difficult to change and are slow to open and close. WebMate/Foundation software has a built-in database to separately store content, scripts and formatting commands in Hypertext Markup Language.

"These guys are doing some pretty slick stuff," said Michael Goulde, an analyst at Patricia Seybold Group in Boston. Because the database stores data and formatting tags separately, users can change the site more easily. And data stored in a database can be accessed more quickly than it can from conventional Web sites.

More efficient

At a conventional Web site, each page is a separate file — or several files — and each file takes time to open and close. By using database storage, the equivalent of many Web pages can be stored in a single file, which reduces the system overhead required to open and close files.

WebMate/Foundation software also has a built-in scripting language — a mix of the C and Perl programming languages — and built-in debuggers that make programming more simple, said Anker Berg-Sonne, vice president of engineering at WebMate in Canton, Mass.

WebMate isn't alone in offering links between databases and the Web. Most of the commercial Web servers, including those from Netscape Communications Corp. and Microsoft Corp., offer database connectivity. In those

WebMate/Foundation *software lets users connect databases with the Web*

cases, data is taken from a database and incorporated in conventional, flat-file Web sites.

And database companies Oracle Corp. and Informix Software, Inc. offer data stored directly in Web sites. But WebMate claims its Web server with database is implemented in an architecture

that is faster and more secure than the systems used by Oracle and Informix.

WebMate/Foundation will become available today. It costs $90 for a two-month introduction, after which it will cost $495. It will be available on Microsoft's Windows NT and common versions of Unix. It will support all common browsers.

A SQL database gateway that will let Web sites access data stored in corporate databases will be available in the third quarter. It will cost less than $1,000.

Also in the third quarter, WebMate will release a module for processing payments online. It will cost less than $1,000.

Netscape chair floats online ideas to promote and fund America's Cup

By Charles Babcock

Jim Clark, chairman of Netscape Communications Corp., said he is going to use the Internet in new ways to lobby for a pet cause: the America's Cup challenge.

Clark wouldn't provide specifics, but he said he is going to cash in on some of the popularity of his company's World Wide Web page.

Clark, who spoke recently at the St. Francis Yacht Club in San Francisco, said Netscape's Web sites receive 75 million hits a day. He said he thinks some of those visitors will link to a Web page for *AmericaOne*, the proposed challenger to New Zealand for the America's Cup in 2000.

Clark will be chairman of the drive to raise funds for *AmericaOne*, which will cost $30 million to $40 million to design, build and sail. Clark hinted that one way to

generate support would be to create a Web page that reports on the ship's design and computer-simulation studies.

"The Internet is an entirely new medium. There's a lot of creative things you can do," he said. Clark said he plans to use the Internet to directly solicit funds. He has pledged to raise a percentage of the necessary funds himself but said he wants to popularize the sport, not donate all the funds.

Clark's references to yacht designer Bruce Nelson and crew made it clear that they might be expected to take part in Web site discussion groups.

Paul Cayard, future captain of *AmericaOne*, showed promise as a discussion group participant when asked if he was open to including women on his crew. "This is San Francisco," he said. "We're open to anything."

Security

avoid Internet use, said David S. Bauer, a principal and security specialist at Morgan Stanley & Co. in New York.

"We have to attack the culture and build trust," Bauer said in a speech at a recent meeting of the New York chapter of the Information Systems Security Association. He said senior managers at Morgan Stanley balked at connecting to the Internet because of

their perception that it is "hemorrhaging information."

Bauer called on the industry to build a "public key infrastructure," a broad set of interoperable technologies built around public-key cryptography and digital signatures that would offer identification, authentication, privacy and integrity services.

Be prepared

That would give rise to a "culture of trust" that would let companies fully exploit the potential of the Internet, Bauer said.

Current work in this area is a

piecemeal effort by product vendors and isn't likely to produce a seamless infrastructure without more active involvement from users, Bauer said.

The Senate report, distributed at a recent hearing on "Security in Cyberspace," pulls no punches in denouncing the government's lack of preparation for Internet-borne mischief. It cited the following examples:

● Because the U.S. Department of State has no security plan for its unclassified systems, it can't tell if those systems are compromised.

● The Federal Aviation Administration's computers are relatively immune to hackers, not because they are carefully protected but because they are so antiquated that they are inaccessible by modern hacking tools.

● A senior intelligence official recently was quoted as saying that government efforts to collect data about "information warfare" threats are like "a toddler soccer game, where everyone just runs around trying to kick the ball somewhere."

The Senate investigators recommended the establishment of a national "threat center," staffed around the clock with officials from law enforcement, intelligence and the military.

Corporations need to boost their commitment to information security, said Richard Power, an analyst at the Computer Security Institute in San Francisco. "Organizations that don't already have [a security] program in place must implement one immediately," he said.

Web converts

Prodigy did make one concession in that regard, however. Company officials said that by fall the Prodigy client will work with the standard Internet access software included in Windows 95. They wouldn't comment on when it might support other Internet access software.

Officials at the online services said the companies have been

pushed to the Web by its overwhelming popularity and by demand from customers. They also said they like that Internet software comes to them off-the-shelf, allowing them to turn staff from writing software to other tasks.

"We're not in the software business," said Kevin Knott, vice president of strategic planning and development at CompuServe in Columbus, Ohio. "For years we've had to develop the technology because it didn't exist. That's a strain on our people and investment dollars."

Hackers land at air force base

On March 23, 1994, two hackers on the Internet penetrated computers at Rome Laboratory at Griffiss Air Force Base in New York.

A report from Senate investigators published last month described how the hackers, "Datastream Cowboy" and "Kuji," accessed the lab's data, which included sensitive weapons research information.

Before the break-in was detected five days later, the hackers had installed "password sniffers" on seven computers, which lead to the eventual compromise of 30 systems at the base.

Using the Rome computers as a base of operations, Datastream Cowboy and Kuji trav-

eled the Internet and hacked their way in to systems at other government facilities. They even found their way in to the corporate networks of defense contractors.

On May 12, after a complex six-week investigation that spanned four continents, police arrested Datastream Cowboy, a 16-year-old hacker in England. They never learned the identity of Kuji, but investigators suspect the second hacker may have been a foreign agent.

Investigators couldn't determine the extent of the attack or the damage done. "It is very difficult to quantify the loss from a national security perspective," a Senate report concluded. — *Gary H. Anthes*

Will the Internet bring an end to business computing as we know it?

Not at all. It will simply knock down the walls between people, between departments — even between companies.

The promise of the Internet, while intoxicating to some, is threatening to others. Because along with the unlimited access and opportunity it provides, comes the need for new strategies and new technologies. Happily, those who've begun the transition to client-server already have much of what they need in place. And to help businesses incorporate the Internet and intranet into their operations, Microsoft is integrating the necessary technology into many of its products — from desktop to server to tools.

For example, it's never been easier to connect desktops to the Internet. That's because both Microsoft® Windows® 95 and Windows NT® Workstation operating systems have all the "plumbing" built right in. Viewing content is just as effortless. With Microsoft Internet Explorer, users can browse the Internet (or internal corporate webs) whether they're working on the Windows platform or on the Macintosh™.

Of course, making web content easy to view is only the beginning. To be useful to organizations, content has to be easy to create, too. Which is why the latest generation of Microsoft Office applications, along with Internet Assistants, allow users to develop web content without programming. They simply save their work as HTML, the way they would any other document. Such ease-of-use also extends to the newest member of the Microsoft Office family, the Microsoft FrontPage™ web authoring tool, which lets users create and manage entire web sites, even if they've never so much as programmed a VCR.

The Internet is very much a part of our BackOffice™ family, too. With Microsoft Internet Information Server, we've extended the performance of Windows NT Server to make the ideal Internet platform. Now every organization can host and manage web content and applications securely and reliably. And, with Microsoft Exchange Server, secure and reliable e-mail is also a reality, whether it's traveling over the Internet or within your organization.

The truly interactive web page has arrived as well...and with it, full motion video, audio and moving text. Advances made possible by technologies like ActiveX™ controls, which let developers embed sound, video, and applications without having to learn new languages.

Yes, the walls are coming down, but it's not the end of business computing. Just the next, most practical evolution.

To learn more, or to download our free Internet products, visit http://www.microsoft.com/Internet/go2/

Band-width is tight. ATM sounds nice. But it also sounds pretty darn expen-sive.

Switch IBM presents the first affordable 25 Mbps ATM Workgroup Solution. Everyone is talking about ATM as the answer for speeding up busy networks. But there are two good reasons why business hasn't stampeded en masse to the ATM solution: It costs a lot. And to get there, you have to rip out everything you have.

Well, with all respect to the status quo, IBM now unveils the new 25 Mbps ATM Workgroup Solution. It comes complete with workstation adapters, giving you an immediate boost in bandwidth, with plenty of room to grow in the future. And it all comes at the refreshingly low price of $495 per connection.

So why just dream about getting an affordable ATM solution when you can install one today? See your nearest IBM reseller or call us at 1 800 IBM-2468, ext. DA130, to learn more. Or, if you prefer, you can visit our Web site at www.raleigh.ibm.com/netad.html for all of the details. We have lots of information to share. And the good news is, we can get it to you fast.

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Corporate Strategies

TRUCK STOP!

Mack Trucks jumps on frame-relay highway

By Kim Girard

Leave it to Mack Trucks, Inc. to find a way to send its legacy and LAN traffic barreling down a single network.

Last year, the Allentown, Pa., truck and engine manufacturing giant considered upgrading its point-to-point network. Instead, Mack made a move for the long haul by choosing frame relay.

Frame relay won Mack's support because it allows Mack to run SNA and TCP/IP more efficiently over the same network.

"Right now, we are probably about 95% SNA and 5% TCP/IP," said Tim Koch, a senior communications analyst at Mack. "But as we use more LAN applications, the TCP/IP traffic will grow."

With the move, Mack aims to avoid network redundancy, control operating costs and get bandwidth on demand, Koch said.

"With frame relay, we've gained the flexibility of handling multiple protocols and more traffic," he said. "Plus, we've significantly increased our redundancy by adding backup paths to even the smallest sites."

The network is configured with two permanent virtual circuits (PVC), so that the TCP/IP traffic goes over one PVC and the SNA traffic over the other. With a line failure, both protocols are automatically rerouted to the other side of the network to provide full redundancy at the central site.

> "We've gained the flexibility of handling multiple protocols and more traffic."
> — Tim Koch, Mack Trucks

Flexible frame

Frame relay gives Mack the flexibility to optimize network cost and performance, said Liza Henderson, an analyst at TeleChoice, Inc. in Verona, N.J. "It will also [let them] further scale the network in the future as growth demands," she said. TeleChoice estimates that up to half of all frame-relay users are running some SNA traffic over the network.

Mack's network links 25 U.S. and Canadian sites, including parts distribution centers, regional offices, suppliers, Mack-owned dealerships and a manufacturing facility. Within 40 days, 21 sites were hooked up, Koch said. Despite the rapid pace of deployment, rollout issues were minimal, Koch said.

Mack could have saved money by using frame relay instead of expensive private lines, but the company invested that money in a dial backup system.

"We took something very simplistic and made a very robust network," Koch said. "Had we stayed apples-to-apples, we could have had savings."

Mack is using Motorola, Inc. products, including the Multimedia Periphery Router 6520 and Vanguard 300 frame-relay access device (FRAD). A router or FRAD was installed at each site, depending on the size of the facility. The Vanguard 300s were used at smaller sites to save money, and the 6520s were installed where the company needed more serial ports.

Mack Trucks *made a sharp turn to frame relay, which allows the company to run SNA and TCP/IP more efficiently over the same network*

James L. Hebe *is president and CEO of Freightliner, where an in-house application is cutting diagnostic time at dealers nationwide*

Freightliner tool drives employee efficiency

By April Jacobs

Looking under the hood may become one of the *last* steps in fixing a Freightliner big rig, now that dealers have a client/server application aimed at pinpointing a problem.

The application, dubbed ServicePro, includes a case-based logic component, according to Doug Vakoc, Freightliner Corp.'s director of technical service systems. The Portland, Ore., company developed the application in-house.

"I've never seen anything like it," said Kimberley Brewer, a service writer at the Fyda Freightliner dealership in Columbus, Ohio. She recalled when a driver came in with a heating problem that seemed to elude everyone. But with ServicePro, all it took was four questions to come up with a possible faulty valve.

The truck was repaired in a half-hour, she said, whereas it might have taken several hours to pinpoint the problem manually.

A big ServicePro advantage, Vakoc said, is that a service person can diagnose a rig's problem when he takes down the initial information from a driver who is experiencing problems on the road. That way, when the driver brings the rig in to be fixed, the mechanic already knows what is likely to be wrong with it.

> "As we expand our product lines ... it's really important to make maximum use of the manpower we have."
> — Doug Vakoc, Freightliner

Nuts and bolts

Vakoc said the ServicePro application is purchased primarily by independent Freightliner dealers across the country. It runs on Microsoft Corp. Windows NT servers with a Windows for Workgroups client. A SQL Server database, which resides on the server at the dealership, contains information that service desk users and technicians access daily. That database is updated via CD-ROMs sent out periodically by Freightliner.

For information about product warranties, recalls or parts, dealers can access an IBM mainframe located in Portland via Freightliner's frame-relay network.

"We're still rolling out the system, but we have about 150 dealer installations to-

Rx for managed-care interoperability

Alliance proposes to help health care providers share patient information

By Thomas Hoffman

A group of medical-care providers is preparing a set of software that should help hospitals and other organizations share patient information more easily.

The effort comes in response to the cost pressures associated with managed health care that have driven doctors, hospitals, pharmaceutical companies and other organizations to become more patient-centric and to share information more freely.

More than 80% of the 5,500 acute-care facilities in the U.S. have linked their networks to other facilities with which they share patient files and other information, according to Deloitte & Touche.

The problem is that the health-care industry has lagged behind other vertical industries when it comes to technology standards and system interoperability.

"We're about 10 years behind the banking industry in this area," acknowledged Nancy Hinckley, a marketing program

> In Boston, "there are major deficiencies in interoperability between [health care] providers and payers."
>
> — Christopher J. Macmanus,
> VP of IS,
> Beth Israel Hospital

manager at Hewlett-Packard Co.'s Medical Products Group in Andover, Mass.

To overcome those challenges, a group of industry players has banded together to establish common data-interchange standards.

The Andover Working Group for Open Healthcare Interoperability, formed in March by HP, comprises 54 health-care providers, hardware and software vendors, systems integrators and pharmaceutical companies.

The group is developing an object-oriented framework that incorporates existing health-care information interchange standards, such as Digital Imaging and Communications in Medicine and Electronic Data Interchange For Administration, Commerce and Transport.

The framework will also use capabilities of both the Common Object Request Broker Architecture (CORBA) and OLE technologies.

Plug-and-play
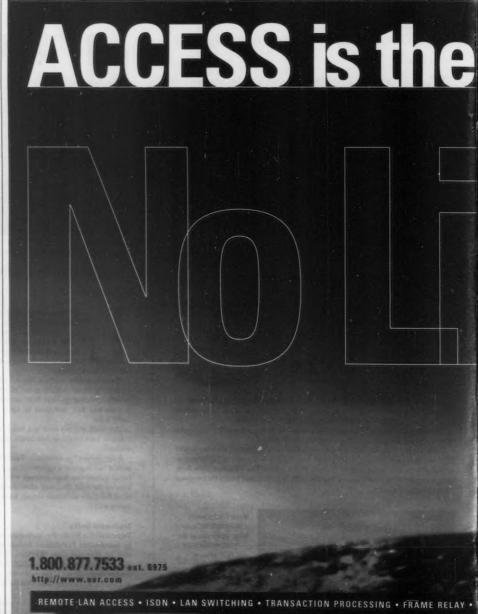
Through the development of an Enterprise Communication Framework, Andover Group says it expects to establish plug-and-play interoperability among a variety of clinical and patient applications.

"The primary challenge for us is interoperability between enterprises," said Christopher J. Macmanus, vice president of information systems at Beth Israel Hospital in Boston. Even though Boston is a hub for managed-care players, "there are major deficiencies in interoperability between [health-care] providers and payers," Macmanus said.

The first standard under attack by Andover Group is Health Level Seven, a protocol standard for the transmission of clinical and administrative information.

Andover Group's aim is to allow organizations to pick and choose between CORBA and OLE, Hinckley said.

BankAmerica expands online banking

By Mitch Wagner

BankAmerica Corp. is taking personal finance on the Internet a bit further.

The $16.5 billion San Francisco bank has begun to let customers pay bills online on the Internet, even if the recipient of the money doesn't have an account with BankAmerica. Other big banks, such as competitor Wells Fargo & Co., allow users to transfer money between accounts — moving money between two places on the same computer system.

The BankAmerica site allows customers to send money to noncustomers by filling out a form on the company's Internet site at www.bofa.com. That triggers an electronic-mail message to a bank employee, who sets up the transaction off-line with the person who will receive the money.

BankAmerica also offers the service with the Managing Your Money dial-up software for PCs and on America Online.

"You can see how the battle for Web capabilities in online banking is stepping up," said Phoebe Simpson, an analyst at Jupiter Communications in New York. "Until recently, Web banking was a pie-in-the-sky idea; now, the large banks are starting to compete with their Web banking services."

BankAmerica sees online banking as a natural extension of its other electronic banking services — including automated teller machines — offering customers convenience and the ability to bank from home, at any time.

And the technology is also an extension of automated teller machine (ATM) technology, said Robert Newton, vice president of interactive banking product development at the bank.

How it works

The back end of the system is the company's IBM mainframe-centric network that links branch offices and ATMs. Linked to the mainframe is a Tandem Computers, Inc. server that has hosted home-banking services since BankAmerica started permitting dial-up access to its accounts 15 years ago, Newton said.

The Managing Your Money software dials directly in to the Tandem box, Newton said. Customers can also reach the bank from AOL, through a Sun Microsystems, Inc. SPARCserver 20 that runs custom software built by Destiny Software Corp. in Elverson, Pa. AOL simply passes data from its own servers to the SPARCserver, which translates the data for the Tandem machine and feeds it in to the mainframe.

For the bank's Web site, BankAmerica runs Enterprise Server software from Netscape Communications Corp., with built-in encryption for security. The server software runs on a Sun SPARCcenter 1000.

The bank selected the modular software and hardware strategy to guarantee flexibility and ease of modification for the system.

Freightliner
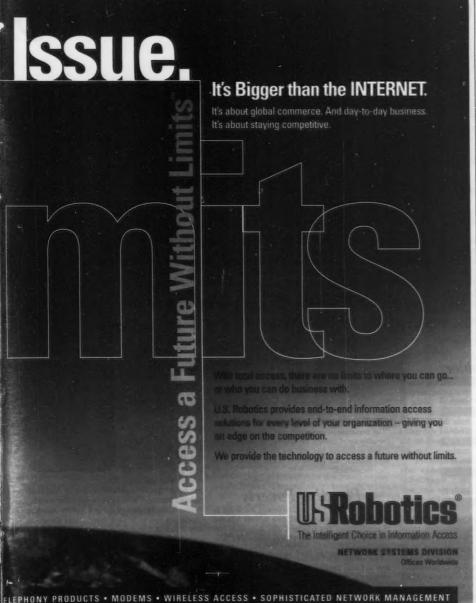
day," Vakoc said. The company developed ServicePro in C++, with Microsoft as a consultant on the project.

Chip Gliedman, an industry analyst at Giga Information Group, a consultancy in Cambridge, Mass., said systems such as those at Freightliner seem to be growing in number.

"There are fewer people to turn to for help," he said. "What these systems really do [is let employees] concentrate on what they're being paid for."

Vakoc said the company wanted an interface that would allow technicians to use several different types of reasoning when diagnosing which part is malfunctioning, without needing to learn different interfaces.

ServicePro is critical to Freightliner's progress, Vakoc said. "As we expand our product lines to fire engines and school buses, it's really important to make maximum use of the manpower we have."

Managing

Love **IT**; Hate my

By Robert L. Scheier

"Happy families are all alike. Every unhappy family is unhappy in its own way."

Leo Tolstoy, from Anna Karenina

Computerworld's annual survey of top executives shows that they like what information technology can do for their businesses. But the bigwigs aren't all that enthused with the people running their own IS organizations. Just as with unhappy families, there's no one reason why the relationship between IS and business managers breaks down. Here, some of the 400 executives surveyed describe why they're unhappy.

The Cobbler

A marketing manager at a travel services company thinks of his information systems department as a cobbler who makes better shoes for his customers than for his own children.

IS regularly rolls out top-of-the-line hardware and software to key outside customers such as large travel agencies. But inside the company, some staffers who work the help desk are still stuck on dumb terminals, forcing them to forward PC support calls to other help desk personnel who have PCs, the marketing manager says. Until three or four months ago, users on different LANs or in the field often found it hard to share documents because they used different versions of Microsoft Word or ran Microsoft Works instead of Word, he says.

The contrast was not only galling, but also embarrassing. "It was difficult to ... position ourselves as a technology leader when our internal level of technical expertise was somewhat behind the times," he says.

Management focused on deploying technology to its customers because "that was the business we were in; that's where we derived our money."

That has changed over the past 18 months, he says. More than three quarters of the users now have 486 or Pentium PCs, and more than 90% are standardized on Word 6.0. Still, the disappointment in IS lingers. "The organization one would normally expect to be the advocate of change, the advocate of the efficiency of new equipment, was not," the marketing manager says. Instead, "the [users] had to take over the advocacy themselves."

Pleading Poverty

Most of the executives we interviewed asked not to be identified because they still have to work with the IS organizations they criticized. That anonymity prevented us from asking most IS organizations for their side of the story.

One exception is Commercial Federal Corp., a savings and loan institution in Omaha. David Kellogg, manager of financial reporting, and Dennis Zimmerman, director of IS, had much different views about what was important to the organization and who was responsible for such things as training budgets. After hearing Kellogg's comments, Zimmerman says he may need to spend more time communicating with

business managers and managing their expectations.

Kellogg isn't bothered as much by what his IS department provides as he is by what it can't provide because it doesn't have the money. All too often, he says, "you're only getting 10[%] to 20% of what the system can do" because of a lack of money for customization and training. For example, a real estate tracking system "had a lot of nice features ... but the reporting capabilities had to be customized, [and] there's an overall lack of resources to ... generate the custom reports," Kellogg says.

Zimmerman has a different perspective, driven by demands from senior management to cut costs. "Anytime you customize software, it entails additional cost and additional work. It's been my directive to only customize where absolutely necessary," he says.

Training is another sore spot for Kellogg because the company trains "five or six people, maybe 10, and [they] are supposed to go back and train everyone else. Not everybody has the time to ... learn all these

ILLUSTRATIONS BY TROY THOMAS

IS *department*

complex systems. [Over time] less and less gets passed on. Within a year or so, as turnover occurs, you're losing knowledge."

"I'm sure that's true," Zimmerman says, but he again cites financial pressures: "There's a cost to training, and every business today is trying to minimize those costs."

Who is responsible for making such decisions? Kellogg says it's up to the IS director to find money for customization and training because they are "major aspects of an implementation plan." But Zimmerman says the training budget is largely set by senior management, and he and users make customization decisions.

The Order Taker

As a former programmer, this financial analyst doesn't take pleasure in criticizing the IS function at his East Coast insurance company. "There are good people down there, and they work hard," he says. "But all too often they're order takers and backlog creators."

By which he means that IS professionals will usually accept orders from users without asking the right questions. One example, he says, involves allowing users to install 30 dedicated telephone lines to give agents access to applications from the field. But "they never had more than two or three [lines] in use simultaneously," he says. The systems analysts never asked the right questions to better predict the system's use.

The IS department also followed, rather than led, the company's move to client/server technology, the analyst says. "They were sort of standing around, waiting for us to make requests," he says. "For me, that indicates a strategic lack of leadership."

The Dunce

Strategic systems? No problem. Replace my hard drive in two hours? Ummmm...

That's the reputation IS has at a large telecommunications firm, according to the company's East Coast marketing director. "At a corporate level ... they're doing great things; re-engineering our systems, allowing access to data ... tying databases together that weren't together before," he says. Those benefits are real and important, but "the guy with the tool belt, he's real

slow in coming."

Users are partly to blame for their own support woes, he admits, for using many different brands of modems and PCs. That situation is improving as old PCs are replaced with a standard desktop configuration, "but that's being done on an attrition basis," he says.

As in other companies, IS got slammed for being slow to champion new technology, such as Lotus Notes. "There are pockets of [Notes servers], but it's hell to pay to just get up on it," he says. Promoting new technology that can help the business ought to be part of IS' mission, but "you don't hear from them much," he adds.

Hung Out to Dry

When a baseball team founders for long enough, it could be in for a major housecleaning. That's what's happening at Tellabs, Inc. in Lisle, Ill., as it moves from a "sleepy, but got-the-job-done" AS/400 environment to SAP's R/3 client/server financial software, says vice president of strategic resources Tom Gruenwald. While Tellabs changes its software infrastructure, it's also challenging the IS staff to shape up or ship out.

Historically, the changes IS made to systems "weren't all that large" and required no real project management skills, he says. "They really didn't know how to plan, staff and budget [for] a fairly large project," Gruenwald says.

The organization had grown complacent and unresponsive, Gruenwald says, but "we have put a new manager in place who is a lot more customer-focused" and who has replaced some lower-level staff. Anyone who can't or won't learn both the new computing environment and the new focus on customer service is out, he says. ■

This week on our World Wide Web site (www.computerworld.com), look for more survey highlights, and join an online discussion about user and IS issues with DuWayne Peterson, former chief information officer at Merrill Lynch & Co. and Security Pacific Corp.

Scheier is *Computerworld*'s senior editor, management.

Business managers think computers are helping. . .

I feel IT is making a fair, good or excellent contribution to:

Operational/financial performance
93%

Quality of decisions
91%

Quality of internal communications
91%

Quality of products and services
90%

Responsiveness to business change
88%

Percentage of business managers who agree with the statement

. . . but their own IS departments are falling short.

I am neutral, dissatisfied or very dissatisfied with:

The quality of IT application development
60%

IS level of flexibility
60%

IS ability to deliver projects on time
58%

IS project management capabilities
55%

The quality of IT operations
48%

Percentage of business managers who agree with the statement

NOTE: Results are from a *Computerworld* survey of 400 business managers conducted in February. Half of the respondents work at companies with less than $500 million in annual revenue, 29% are at firms with at least $1 billion in revenue, and 22% work at companies with revenue between $500 million and $1 billion.

Of those responding, 35% hold director-level positions, 32% are vice presidents, 20% described themselves as "senior management," and 3% are CEOs. Sixty-two percent of those surveyed are responsible for finance and marketing within their companies, and another 12% are primarily responsible for personnel.

Surf sites

http://www.com

Practical Internet sites for IS managers

By Leslie Goff

some 10,000 companies, is cross-referenced by company name, ticker symbol, location, industry and sales volume. You get the basic data — address, officers, sales figures, number of employees, description — and a link to the corporate Web site. You also get links to more information on other servers, such as EDGAR for Securities and Exchange Commission filing information. Who's On Top, a list of lists, such as the 10 Largest Workstation Manufacturers, The Fortune 500 and America's 100 Most Admired Companies, is a fun and useful resource here.

Business Bestsellers is also useful. It reviews the top books for executive readers. The home page at Hoover's Online is a bit overwhelming, however. Click on the What's Here button on the graphical navigation map to get a table of contents, and use that to maneuver around the site.

Sources EJournal
www.dso.com/sources

This off-the-beaten-path online magazine offers compelling reading, especially if you need something else to keep you up nights worrying about the security of your corporate network.

Each issue (three were online last month) has at least one article about information technology and the intelligence community that's of interest to anyone responsible for corporate network security. For instance, an article on how the Central Intelligence Agency used electronic banking and other financial records to bring down drug lords shows just how vulnerable networks can be.

Regular features include a "Sage of the Age Interview," such as a Q&A with Winn Schwartau, author of *Information Warfare: Chaos on the Electronic Superhighway.* The articles have an insider's tone, and they read like a cross between *All the President's Men* and *Fear and Loathing in Las Vegas.* If you need a little reassurance when you're done, go immediately to the National Computer Security Association home page.

National Computer Security Association
www.ncsa.com

Here's an association site that does what it should: disseminate information to the larger community.

You'll find the de rigueur membership information here, but the emphasis is on relevant and actionable content.

You can get descriptions of common computer viruses and tips on avoiding them from the Virus Help Desk (click on the Virus Information button). Or find out about recent alerts issued by the Computer Emergency Response Team (CERT) centers worldwide, such as a notice that Purdue University researchers have discovered a flaw in the Kerberos computer security system. Check

Goff is a freelance writer in New York.

out the association's new antivirus and firewall-testing certification schemes. Every page is rich with thoughtful links to other pertinent, hard-to-find sites. For instance, CERT's Kerberos warning contains a link to details posted on a Carnegie Mellon University server. You may end up linking out of this site numerous times, but chances are, each time you get out, it will just pull you back in.

The Knowledge Management Forum
www.lea.com/~bonewman

As you peruse the member postings at this semi-interactive site, you start to feel as if you've stepped onto the porch of a general store where everyone's sitting around the cracker barrel swapping opinions on the high school football team. But the opinions and information being exchanged here deal with the very intellectual subject of knowledge management, and the exchange is highly organized.

You can meet the members, as the site includes a full list of participants that notes their interests and credentials. You can join discussion groups (for now, via electronic mail only) in 13 subject tracks, such as Capturing Corporate Knowledge, Building Knowledge Architectures and Intranets.

The site includes an index of related papers, publications and books, as well as reviews and links that are diverse yet focused on the subject at hand. The site's members — interested parties can join on the spot — post concise, thought-provoking comments, making this site a worthwhile place where information systems managers can drop by and pull up a chair.

Hoover's Online
www.hoovers.com

Use the free areas of this site as a business research tool if you're checking out the competition, looking for vendors, preparing a presentation or job hunting.

The MasterList Plus database, which boasts

The Technology Partners, Inc. Sourcing Directory
www.tekptnr.com

This site, a user's guide to the outsourcing industry, is hosted by a consulting firm. And the firm does an exemplary job of remaining unobtrusive while you use the site's resources.

The firm contains its pitch to one clearly marked section (Info on TPI) and doesn't exploit opportunities to promote itself within the site's content. Instead, the hosts focus on facilitating your search for vendor information and connecting you with peers. The best resource at the site so far is relatively new. It is The Vendor Directory, which features a useful search engine that enables you to find outsourcers by name or by any combination of services offered, location and industries served. (A search for firms that offer business process re-engineering services to the health-care industry in the U.S. yielded six companies that the system rated as "highly relevant.")

The most promising sections, Marketplace and TPI Chat, are meant to foster communication among IS managers, outsourcing vendors and TPI's consultants. But they are as yet somewhat underdeveloped. The TPI Library and TPI News Room sections are also worth a look, particularly if you want to link to related information on specific outsourcing topics, such as legal issues. ∎

Job hunting? Check out more Web sites in our Computer Careers section.

Book Reviews

IS Manager's
Bookshelf

Why Loyalty Still Works

Loyalty is the secret of long-term success in business, Frederick F. Reichheld argues.
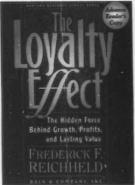
The Loyalty Effect

By Frederick F. Reichheld with Thomas Teal (Harvard Business School Press, Boston; 320 pages; $24.95, hardcover; (800) 545-7685)

Most managers today worry about having to downsize staff. Information systems managers not only have that worry, but the more profound one of keeping qualified staff. This book addresses the issue of employee retention in a thought-provoking way.

The authors, consultants at Bain & Co., share 10 years of research on why certain firms achieve better financial performance than others. Their thesis is that long-term performance is the result of focusing on sustained loyalty — from customers, employees and investors. Long-term customers and employees work together to create products and services that add value. And investors must buy in to this long-term, value-added concept instead of focusing on quarterly results.

The authors substantiate their premise with corporate profiles of United Services Automobile Association, Northwestern Mutual, State Farm, Leo Burnett (the Chicago advertising firm) and several others, each of which has low customer and employee turnover and consistently high performance. Not coincidentally, most are privately held or are mu-

tual companies and thus not subject to the whims of Wall Street.

Reichheld and Teal provide numerous examples of steps companies can take that increase or undermine loyalty. The discussion of employee loyalty in Chapter 4 is of particular interest to IS managers, who have become accustomed to high turnover. Too often we recruit to fulfill short-term technical needs rather than focus on core skills such as creativity, willingness to learn and ability to communicate with users. These traits should allow the individual to contribute over the long haul.

The authors acknowledge that moving to loyalty-based management will be a tough change, not the least because of inadequate methods of measuring customer profitability (Chapter 8). However, most of the companies cited didn't start out with measures, but with principles about how best to do business. These aren't new ideas, but rather useful reminders. I'd make this book required reading at business schools; IS managers should share this book with the human resources managers with whom they work.

Computer-aided Teamwork

Teams & Technology offers plenty of tips but not enough real-world perspective.

Teams & Technology: Fulfilling the promise of the new organization

By Don Mankin, Susan G. Cohen and Tora K. Bikson (Harvard Business School Press, Boston; 304 pages; $29.95, hardcover; (800) 545-7685)

The authors (who are academics and behavioral scientists) tried to show two things in this book: how to develop information systems that support collaborative work and how to create organizational structures and policies that support the synergy of teams and technology. Unfortunately, they didn't focus enough attention on how to transform old, hidebound organizations with long experience in the old, hierarchical model into the ideal. And that ultimately undermines the usefulness of the book.

To give the authors credit, they do recognize that creating teams isn't an easy proposition. The best device in the book is a fictionalized narrative that's actually a composite of several consulting projects. This narrative follows a mythical project through its various travails. All the archetypes are here — the overly ambitious corporate sponsor, brilliant but impractical; the befuddled user representative who gets so caught up in the process that he loses track of the goal; and the IS de-

partment that is at first deliberately excluded, but then is brought in to clean up the mess. Sound familiar? You bet.

The core problem is that the authors spend too much time telling us what we should do.

We get lots of bullet lists, matrices and other perspectives that sound great on paper but are nearly impossible to implement in existing corporate cultures. Corporate sponsors aren't selected; they elect themselves because of ego, power or perceived ability to get things done. User representatives are put on teams because they're available or highly knowledgeable, not because they're suited to be team players. IS is often a spectator because resources are already committed to other projects or because of a perception that they would add little to the project.

This book would be useful to new project leaders who have yet to be part of a cross-functional company team trying to re-engineer a process and the technology to support it. For those of us who have been there, it's all-too-familiar ground. ■

Announcing

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ways to

safely store all

the information

on the planet.

SAVE Somehow, the smaller the world gets, the more its information grows. Each day, networked computers are making more kinds of information available to more people than ever before. From daily stock market prices to weather maps to comic books, the information we generate is the lifeblood of business. And that makes the decision of how to manage and store it even more vital.

At IBM, we're constantly thinking of new ways to maximize the value of your information. Part of which means understanding that different kinds of information can have different kinds of storage needs. For some, the reliability of a 24-hour, seven-day-a-week system is absolutely critical. For others, having instantaneous access is key. And with rare exception, cost is always an important consideration.

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you. On June 10, an OEM agreement added a number of their disk storage systems to the growing IBM storage family.

These innovations, which will soon be available under the IBM name, give you an even greater range of price, performance and capacity variables to choose from. So we can accommodate — and even customize — storage solutions that can keep pace with the way you need to do business.

And we can manage it all with the IBM service and support that you've come to expect. Only better. Smarter. Faster. Cheaper.

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Buyer's Guide

PHOTO BY CHAMBERS

new Pentium Pros pack a punch

PC servers push their way into the midrange; HP scores best performance numbers

For years, information systems managers have been promised inexpensive PC servers that could match the performance and manageability of proprietary midrange systems. A new generation of servers based on Intel Corp.'s Pentium Pro chip has brought that day within view.

We reviewed four similar servers that validate the dawn of this new generation. An evaluation of the Revolution Quad 6 from Advanced Logic Research, Inc. (ALR), the Proliant 5000 from Compaq Computer Corp., the NetServer LX Pro from Hewlett-Packard Co. and the PC Server 704 from IBM indicates that Intel-processor systems have reached a new level of maturity. Each of the four servers provides performance comparable to — and in one case equal to — typical midrange systems such as IBM's AS/400 Model 2020. Each tested computer is the latest and most powerful system of its type available from the vendor.

Computerworld chose the computers based on a list of market and technology leaders gleaned from analysts' recommendations. Some companies on the list had configurations in development similar to those tested but weren't able to provide hardware in time for the evaluation.

BY CURTIS F. FRANKLIN JR.

With the exception of the ALR computer, none of the systems was available for purchase at the time of the evaluation. For this reason, documentation wasn't considered a feature for comparison. The state of the three prerelease machines varied from very polished to rather preliminary, but all provided valuable insight into the likely performance characteristics of the final systems.

On your (bench)mark...

We compared the systems' performances by using the RPMark 95 benchmark (see RPMark box, page 95). This benchmark places loads of decision support, online transaction processing and file-serving transactions on a server simultaneously. The RPMark 95 scores are relative performance ratings based on the number of operations performed per min-

Pentium Pros, *page 94*

Editor's note

A new wave of Pentium Pro-based machines is hitting the market. These packages of up to four 166-MHz CPU chips bring PC server technology to a new level. They can churn complex transaction processing and decision-support applications almost as fast as minicomputers that were designed specifically for such tasks. In this Buyer's Guide, we try to give information systems managers a sense of what they stand to gain from four-way 166-MHz Pentium Pro-based servers.

In our comparison of machines from four vendors, we found that each has good points and not-so-good points. But it's clear that the servers as a group represent a step up in terms of performance and configurability.

Now that the 166-MHz machines are available, it's time to think about the next stage: 200-MHz Pentium Pro-based servers, larger cache sizes and a new generation of Pentium Pro-based machines that run at 266 MHz and 300 MHz (see story, page 98). For now, though, here's a look at the four-way machines.

— *James Connolly*
Technology
Evaluations Editor
james_connolly@cw.com

Who's here?

In seeking to identify the benefits users may gain from the new generation of Pentium Pro servers, and the differences among systems from leading vendors, *Computerworld* solicited recommendations from several analysts who identified the vendors most likely to be of interest to corporate IS managers. The analysts based their recommendations on market presence and the technical capabilities of the vendors.

Test facility Client/Server Labs, Inc. in Atlanta was commissioned to request four-processor 166-MHz Pentium Pro servers from the recommended vendors. Several vendors reported they wouldn't have systems available in time for this review. Client/Server Labs tested the four systems that were available.

Contacting the vendors

Advanced Logic Research, Inc.
Irvine, Calif.
(800) 444-4257
www.alr.com

Compaq Computer Corp.
Houston, Texas
(800) 345-1518
www.compaq.com

Hewlett-Packard Co.
Palo Alto, Calif.
(800) 752-0900
www.hp.com

IBM
Armonk, N.Y.
(800) 426-3333
www.ibm.com

HP edges ahead

RPMark 95 test scores				
	HP	**Compaq**	**ALR**	**IBM**
Decision support systems	901.3	808.0	714.7	677.3
Online transaction processing	965.4	866.1	871.7	868.0
Office automation	92.3	94.5	93.6	92.8
RPMark 95	431.3	404.4	387.7	379.2

Pentium Pros

ute compared with a baseline index defined by Client/Server Labs, Inc. in Atlanta.

All systems were tested under Microsoft Corp. Windows NT 3.51 and Microsoft SQL Server 6.0.

The systems that were evaluated shared several key features. Each arrived with four 166-MHz Pentium Pro processors, and each processor had 512K bytes of Level 2 cache.

Each system was evaluated with fast and wide SCSI-2 storage adapters, hot-swap internal hard disk drives and at least 256M bytes of memory.

All the systems provided for expansion through Peripheral Component Interconnect (PCI) and Extended Industry Standard Architecture (EISA) buses.

And each machine was equipped with systems management software designed to make large-installation management possible.

ALR Revolution Quad 6
Price/performance leader, but not a top-tier vendor

If price/performance ratio is the primary focus of a decision, then ALR's Revolution Quad 6 is the leading candidate. With hardware that costs less than $40,000 and a performance rating that is 90% of the leader's, the Revolution Quad 6 has the best price/performance ratio of any of the systems tested.

ALR designed the Revolution Quad 6 with significant internal expansion capabilities. There are 15 expansion slots — seven PCI, seven EISA and one shared. Storage can be expanded through 13 internal drive bays, and an additional 15 hot-swap bays are optional. Memory can be raised to 2G bytes of error-checking and correcting (ECC) RAM.

Continual operation is enhanced through the availability of dual power supplies, though they are powered through one cord. ALR's Informanager software works through the system console and an LCD touch panel that provides information on power, component and environmental parameters.

The Revolution Quad 6 turned in an overall performance of 387.7 points on the RPMark 95 benchmark, third out of the four systems tested for this evaluation.

Compaq Proliant 5000
Good external expansion capability, limited internal capacity

While the other systems in this evaluation were designed to maximize internal expansion capabilities, Compaq designed the $50,966 Proliant 5000 to take advantage of external cabinets for storage expansion and offer flexible slot-based adapter expansion. The Proliant 5000 has only four internal drive bays — the system that was tested for this article came with two external drive cabinets. The system provides nine expansion slots — five PCI, one EISA and three combination slots. The PCI slots are divided between two buses, which allows for increased throughput.

Compaq's Proliant 5000, scheduled for introduction today, can be equipped with up to 2G bytes of ECC RAM through dual in-line memory module expansion. It was the only system that arrived for the evaluation with dual-package modules. The system can be equipped with dual power supplies and, of course, each drive cabinet has a separate power supply.

Compaq's Insite Manager software can notify a manager about a hardware component that shows warning signs of failure before actual failure occurs. This feature, along with an available prefail replacement warranty, was designed to let managers schedule component replacement rather than react to catastrophic failure.

The Proliant 5000 scored 404.4 on the RPMark 95 benchmark, second-highest among the tested systems and within 10% of the performance returned from some of IBM's RISC-based AS/400 systems.

But beyond the basics, features and implementation made for significant differences among the systems.

**A look at
the bottom line**

The tests showed that performance of the four systems is clustered in a relatively tight band, although the HP system stood out from the others in overall performance.

The HP computer's performance puts it on a par with recent AS/400 benchmark numbers. From a price/performance standpoint, the ALR system was the clear winner.
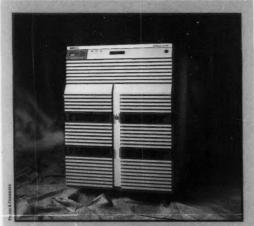
The Compaq and IBM computers were competent performers but had neither displayed the compelling performance of the Hewlett-Packard machine nor the outstanding affordability of the ALR product. ■

Franklin is lab director at Client/Server Labs, Inc. in Atlanta.

The RPMark 95 Benchmark

The systems for this evaluation were benchmarked using RPMark 95, a test designed to indicate the performance of a server configuration under the type of multiapplication load frequently seen in the business environment. The benchmark places three application loads — online transaction processing, decision support and file serving — on the server at the same time. Scores represent each system's performance relative to a reference rate defined by the benchmark. The final RPMark 95 score is a geometric mean of scores for multiple runs. For more information about RPMark 95 and Client/Server Labs, see www.cslinc.com or call (770) 552-3645.

Why SQL Server 6.0?

At the time of this evaluation, Microsoft Corp.'s SQL Server 6.5 database management system had been generally available for less than a month.

Though several benchmark results have been announced that used SQL Server 6.5, there are many differences in the tuning parameters between Version 6.0 and Version 6.5.

Indications are that the newer version of SQL Server will show improved performance compared with Version 6.0, especially under online transaction processing applications. But moving a server from Version 6.0 to 6.5 involves far more than simply loading the new version and restarting the application.

Officials at Client/Server Labs and editors at *Computerworld* decided to test the four Pentium Pro-based servers by using the earlier version of SQL Server so the issue of tuning a new version of the database manager wouldn't arise with this review.

Several of the vendors covered in this feature, including Oracle Corp. and Microsoft, have released their own benchmark results that used different DBMSes.

Hewlett-Packard NetServer LX Pro
Exceptional power, but at a price

When it entered the Pentium Pro-based symmetrical multiprocessor server market, HP designed its NetServer LX Pro with attention to the details necessary to enable ready management and configuration of the server. Features such as top-side access to the 10 expansion slots and HP's NetServer Navigator software make the NetServer LX Pro the most convenient to change and configure. The system's performance, which topped the field, makes its $66,000 price for the tested hardware configuration more palatable.

Like the Proliant 5000, the NetServer LX Pro's PCI slots are divided between two buses. In addition to the six PCI slots, the HP provides four EISA slots for expansion. No slots are shared between the two bus types. Twelve hot-swap drive bays allow up to 109G bytes of internal storage using current technology. It has 2G bytes of ECC memory. All this is offered on Intel system boards that are protected by three power supplies. By comparison, the IBM and ALR computers each depended on two power supplies, and the Compaq was tested with a single supply, though a redundant power supply is optional.

The NetServer LX Pro, scheduled to ship in a month, received 431.3 on the RPMark 95 benchmark, topping the field by a considerable margin. The HP system scored nearly 100 points more than its nearest competitor in decision-support and online transaction-processing components. This indicates that the storage interface and devices are well matched to the rest of the system.

IBM PC Server 704
Smooth power with preproduction rough edges

Of the four systems tested in this evaluation, the IBM PC Server 704, which costs $54,319, was received in the earliest stage of its life cycle. There were small indications of its preproduction status, such as the hand-assembled condition of the case. Larger signs included the meaningful difference in performance between the IBM and HP computers, even though they share a common set of Intel system boards.

Like the HP and ALR systems, the PC Server 704 has significant room for internal expansion, including six PCI and four EISA slots, 12 hot-swap drive bays and up to 1G byte of ECC memory. There are two power supplies with two cords; a third power supply is optional.

IBM's NetFinity management software is included with the PC Server 704, which allows for ready management of hardware and software components.

The IBM system had the lowest number on the RPMark 95 benchmarks run for the evaluation (see test results, page 94), although it was essentially equal in performance to the ALR and Compaq computers. IBM indicated that tuning remained to be done on the system before its general availability. It will be interesting to see how much performance improvement is gained.

Up to the minute

Here's a quick look at some recent Pentium Pro-related announcements:

● Compaq Computer Corp. announced Proliant 5000, a high-end Pentium Pro-based quad-processor-capable server. Audited TPC-C benchmarks revealed that the Proliant 5000, which is powered by four 166-MHz Pentium Pro processors, delivered mid-range-level performance of 5676 tpmC with an industry-leading price/performance value of $136/tpmC. The company also introduced the ProSignia 300 5/150 workgroup file/print server, which integrates the 150-MHz Pentium processor.

● Stratus Computer, Inc. delivered the industry's first fault-tolerant, high-availability multinode Windows NT server cluster that supports Pentium and Pentium Pro technology.

● Digital Equipment Corp. unveiled the Prioris 6000ZX at Comdex/Spring '96.

● IBM shipped PC Server 704.

● Hewlett-Packard Co. announced the midrange NetServer LH Pro, which is set to ship by year's end, and the high-end NetServer LX Pro, the VA and XA, which is due next month. It also unveiled two Vectra PCs based on Intel's 180- and 200-MHz Pentium Pro processors.

● Dell Computer Corp., IBM PC Co., HP and Gateway 2000, Inc. demonstrated systems that use powerful processors when Intel announced its 200-MHz chip early this month.

● Netpower, Inc. unveiled its four-processor Pentium Pro Sparta server based on Windows NT.

You'll get still more for less

Design efficiencies, competition should let users buy more server power at lower prices

In the next year, buyers will find a lot of good news wrapped in Pentium Pro-based server boxes.

Heavy competition among vendors and a server-friendly chip design should nudge systems prices down and improve performance and availability features, according to analysts and other industry observers.

Two- and four-way symmetrical multiprocessing (SMP) designs will step forward as the preferred platforms for workgroup and enterprise LANs that rely on Unix, Novell, Inc.'s NetWare 4.0 and Microsoft Corp.'s Windows NT, analysts say.

BY STEVE BOSAK

The Pentium Pro seems to have remedied server design problems inherent in the original Pentium architecture.

To exploit the Pentium for server work, especially in multiprocessor configurations, secondary cache and processor-to-Peripheral Component Interconnect chip set architectures had to be custom-designed. As a result, four-way Pentium servers were late arriving and, in many cases, more expensive than anticipated. The Pentium Pro, on the other hand, was designed to be "server friendly," with on-board secondary cache and high-speed 66-MHz bus support built on the chip. Though the Pentium Pro comes in 133-, 166- and 200-MHz speeds, only the 166- and 200-MHz chips come with 512K bytes of Level 2 cache that run at the same speed as the processor.

An Intel Corp. spokesperson says this extra high-speed cache is essential in multiprocessor server configurations for storing memory segment addresses and directing I/O traffic more efficiently.

Next generation

Higher-speed versions of the Pentium Pro that run at 266 MHz and 300 MHz are expected late this year or early next year, according to analysts and news reports. Chips above 300 MHz will fill in performance gaps until Intel releases its P7 processor, code-named Merced, sometime in 1998. The P7, in initial design stages now, will be a hybrid RISC/CISC processor, with full 64-bit addressing, system bus and memory support.

In a strategy shift, Intel is designing and shipping complete motherboards to server vendors. The only design decisions left for most server manufacturers are the selection of disks and power supplies and the addition of high-availability features. With little to differentiate these Intel motherboard systems in raw performance, look for vendors to tout RAID and other redundant components, server management software and aggressive pricing as competitive advantages.

While mass-market PC manufacturers now have an easier entry into the production of four-processor servers, super-server manufacturers feel the pressure.

Companies such as Netframe Systems, Inc., Tricord Systems, Inc. and Chen Systems, Inc., seen as providers of custom-designed, high-performance servers, face the challenge of moving their designs even further upscale.

"With the Pentium Pro design, Intel has incorporated many features where we used to spend a huge chunk of our development money. Now we can spend it elsewhere — in improving system bus speeds, developing high-speed Level 3 cache systems and delivering eight-way SMP systems," says Cory Devor, vice president of systems development at Tricord. ∎

Bosak is a freelance technology writer in Batavia, Ill.

Buyer advisory: Let others take chances

By Kevin Burden

If you plan to buy a Pentium Pro-based server, analysts advise being conservative and choosing a seasoned server vendor that knows what to do the instant the server crashes.

Safe bets are market leaders such as IBM, Compaq Computer Corp. and Hewlett-Packard Co. If you need this much horsepower from a server, chances are you run critical applications that require high availability. "That's why you should default to leading vendors who know about reliability and serviceability," says Jon Oltsik, an analyst at Forrester Research, Inc. in Cambridge, Mass.

Buyer beware

Don't be seduced by a low price, Oltsik says. That warning may be cliched, he says, but the trap is easy to fall into with standards-based systems. After all, with Intel Corp.'s engineering at the heart of every server in this class, the common perception is that you'll get a quality box even from lower-tier vendors is correct, Oltsik says. But there are enough differences among the systems to make the decision difficult.

For example, several vendors have opted to design their own motherboards instead of using Intel's stock board, according to Jerry Sheridan, director and principal analyst at Dataquest in San Jose, Calif. These vendors can provide improvements and special features above and beyond what is offered by Intel. What's missing is the Intel motherboard, which will be the standard, Oltsik says. "We tell clients, 'Let other people be the guinea pigs.' Even though some vendors will re-engineer something better in the short term, it will be obsolete in the long term," Oltsik says. But if Intel inadequacies, such as small cache, can't be tolerated, the lure of architecture improvements may be too great.
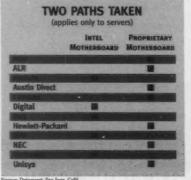
Still, Oltsik says, "If everything you need isn't wrapped into Intel's architecture today, it certainly will be over time." Intel's current standard is 1M byte of cache, which should be configurable in the near future.

Users should pay particular attention to the differences in software, not hardware, Oltsik says. "The value added is the systems management software included with the server," he says. "And it's not just which management package. It's how the vendor enhanced it and how well it fits in to your own distributed network."

This is another reason to stick to leading vendors that know about servers that gracefully fit in to networks. "The less common they are, the more work they are. So while up-front cost may be low, over time cost will be higher," Oltsik says. ∎

TWO PATHS TAKEN (applies only to servers)		
	INTEL MOTHERBOARD	PROPRIETARY MOTHERBOARD
ALR		■
Austin Direct		■
Digital	■	
Hewlett-Packard		■
NEC		■
Unisys		■

Source: Dataquest, San Jose, Calif.

Burden is Computerworld's *senior researcher, Scorecard/Firing Line.*

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WHERE DO YOU WANT TO GO TODAY?™

Quiz Show 2000

By Robert S. Arnold

Think you know your year 2000 issues inside and out? Then step right up, and test your conceptions (or are they misconceptions?) about the problem and the solutions.

So you say you've got a handle on the year 2000. Are you proceeding based on a firm knowledge of facts about the problem, software maintenance, software testing and impact analysis? Does your hired help know all this, too? We'll see about that.

Answer the following. In multiple-choice questions, pick only one response. In yes/no and true/false questions, choose the response you think is proper most of the time. You'll find the answers and explanations on page 102.

QUESTIONS

1 What calendar does the U.S. public most commonly use?
Julian
Gregorian
Lunar

2 Jan. 1, 2000, falls on a
Tuesday
Friday
Saturday
Sunday

3 Which of the following are leap years? (Hint: There's more than one correct response.)
1900
1982
1988
1990
2000
2004

4 Year 2000 problems can occur only on or after the first day of 2000.
True
False

5 What is the best representa-tion for a date?
DDMMYY
DDMMCCYY (CC means century: 19 or 20, for example)
Current International Standards Organi-zation (ISO) standard
Current American National Standards Institute (ANSI) standard
Date abstract data type (or a date class in object-oriented terminology)
Other

6 Year 2000 problems are a sub-set of software maintenance prob-lems.
True
False

7 In program maintenance, most errors are found relatively early in each release cycle.
True
False

8 Impact-analysis tools find all possible impacts in a program.
True
False

9 You run an impact-analysis tool on your code. It predicts that 80% of your code is affected. Does that mean you will need to change 80% of your code to accomplish the change?
Yes
No

10 An impact-analysis tool or service predicts that your year 2000 project will take nine person-years. Should you accept this estimate as accurate?
Yes
No
Unknown

11 In general, testing can show that a program contains no errors.
True
False

12 If a program does nothing that is date-oriented, can it still bomb be-cause of a year 2000 problem?
Yes
No

13 A program is tested; no errors occur. Should you consider the program free of year 2000-related errors?
Yes
No
More checking is needed

QuizShow 2000

ANSWERS

1 Gregorian

2 Saturday
It's a good thing, too. Hopefully revelers won't be using their computers very much, so residual year 2000 problems won't bite people then. But be prepared to come to work Jan. 2 in case new problems surface Jan. 1.

3 1988, 2000 and 2004 are leap years.
A leap year is a year that is either divisible by four but not by 100 or is divisible by 400.

Years 1982 and 1990 aren't divisible by four or 400, so they aren't leap years. Year 1900 isn't a leap year because it's divisible by 100 and not divisible by 400. Year 2000 is a leap year because it's divisible by 400.

The leap year rule is tricky. That's why you should check that your date calculation routines correctly implement it. If the rule is tough for you now, what about the programmer who inserted it in your code 20 years ago?

4 False
These problems have already occurred because they are based on the assumption of a two-digit year field, and dates beyond 2000 have already entered some systems' processing streams. Some two-digit 21st-century years have already appeared in programs, causing problems such as automatic deletion of data by programs that thought data suddenly became many years older.

5 Date abstract data type (or a date class in object-oriented terminology)
"Best" is a loaded word. In general, the date class approach is most useful from a maintenance standpoint. Think of a date class as a collection of subroutines that operate on dates whose representation is known only by those subroutines, not the programs that call the subroutines.

Here's why date classes lend themselves to maintenance. With a date class, the internal representation of the date can be "hidden" — other programs can get at date information only through the subroutines provided by the date class. If you change the date representation (for instance, if you expand years from two digits to four) but preserve the syntax and meaning of the date class subroutine interfaces, you may be able to reduce your date conversion changes to just the date class. (To be on the safe side, there are other areas to check. Most systems aren't designed to make the century date change conversion this simple.) That's a big plus in finding where to make changes and minimizing the ripple effect.

If, like most of us, you're not using an object-oriented language, you can approximate the date class idea through programming discipline. For example, you can create a project library with your own set of date subroutines and mandate that only these routines be used to handle date information.

If you don't implement these suggestions, you may be forced to a lower level, where you must detail the lengths and positions of days, months and years. Here the choice of date representation isn't so simple. Standardization of some kind is in order. Picking an official standard date representation, such as one from ANSI or ISO, is one possibility. But if you already have an internal de facto standard such as YYMMDD, it may be best to leave well enough alone.

6 True
Though year 2000 problems can occur in software development, they are most commonly found now during software maintenance.

7 True
One IBM study by Edward Adams about maintenance fixes showed that in two out of three releases, most errors appeared to be found in the first half of the release cycle.

For year 2000 projects, you can view problem removal as a maintenance release. Watch for the need to make changes shortly after year 2000 fixes become available from your company or someone else's. What's pernicious is that though some year 2000 problems are easy to fix, their repercussions can be devastating. For example, imagine recalculating and issuing corrections for half a million retirement benefits checks.

8 False
An impact-analysis tool estimates what software items are affected by changes to a program. To do this, it uses certain relationships, called dependencies, that model how software parts affect one another. Only a limited number of relationship types are used. That's why you should combine impact analysis with other validation techniques.

9 No
You probably don't need to change 80% of your code because many year 2000 solutions require that only a small fraction of code be changed. That doesn't mean finding, making and certifying the changes won't be time-consuming.

10 Unknown
Little validated empirical data has been collected. Validated means someone has independently taken the collected data and checked its accuracy. The bottom line for cost models is how closely their predictions match reality. Without clear data on reality, this is difficult to show.

As a practical matter, having a highly accurate estimate may not be as important as having one that is defensible and convincing. One way to do this is with activity-based costing, with which you create detailed change processes and carefully cost them out, making sure major cost drivers are accounted for.

11 False
Remember the famous comment of Edsger Dijkstra, computer science and software engineering pioneer. He said testing can show only the presence of errors, not their absence. Because you can only run a subset of all possible test cases, it is possible that test cases you haven't run could reveal errors.

12 Yes
A program that isn't date-oriented can use other programs that use date-oriented information. Errors here can ripple back to the program, causing weird results.

The program may also use date-oriented data. Inconsistencies here (for instance, some year fields are two digits and some are four) can cause problems.

13 No
Again, testing is a safety net that raises confidence in a program. But don't ask of testing what it can't deliver. The Adams study on maintenance fixes, for example, reported that there are some errors that will likely never be found in a product's maintenance lifetime.

SCORING

11 – 13: Expert
9 – 10: Well-informed
7 – 8: Expected
6 or lower: You may want to brush up on program validation, impact analysis and software maintenance. ∎

Arnold is president of Software Evolution Technology, Inc., a software maintenance and re-engineering consulting firm. He is editor of "Year 2000 News," an Internet newsletter, co-author of the book *Software Change Impact Analysis* (IEEE Computer Society, 1996) and author of the book *Software Reengineering* (IEEE Computer Society, 1993). His electronic-mail address is rarnold@sevtec.com.

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Computer Careers

Web sites for career-minded IS
professionals / By Leslie Goff

JOB SURFING!

The Atlanta (and Dallas) Computer Jobs Store(s) www.ComputerJobs.com/ (and www.ComputerJobs.com/Dallas/)

If you want to check out the local job market for information systems professionals in the Southeast or Southwest, these twin sites make a good starting point for finding and contacting potential employers. Each offers a database of available full-time and contract positions, employer profiles, online submission of a skills profile and a Career Help section.

Job postings, updated daily, are sensibly categorized by IS function and tell you what you want to know: a description of the job, skills requirements, start date, salary and so on. Most contain an electronic-mail link to the job contact, and filling out the skills profile form automatically places your information into a database that is accessible by registered employers.

The Atlanta "store" is better developed; it posts between 300 and 400 jobs daily. It features a localized Career Help section that offers information on area IS job market trends and regional health insurance options for IS contractors. The Dallas store, which went online in May, had 61 jobs posted within the first few weeks. But it offered only three employers, all consulting firms, and the Career Help section wasn't localized enough to be truly helpful.

Career Mosaic
www.careermosaic.com/

While this is a general job search site, it is, nevertheless, a good resource for IS pros. The reason: A wealth of high-caliber employers use it to recruit job candidates. They include MassMutual Insurance Co., Toys R Us, Inc., Miller Brewing Co., Price Waterhouse and nearly all the major Silicon Valley firms. The J.O.B.S. Database lets you search by any combination of job description, title, company and location: Breadth or depth, it is up to you.

Typing in "information systems," "business an-

Goff is a freelance writer in New York.

alyst" and "New York" yielded a reinsurance systems job at an insurance underwriter, and "information systems," "programmer/analyst" and "Chicago" brought back two financial systems

jobs at a food company. Each job posting contains an automatic response form, and, separately, you can post your resume online. A Usenet search engine also accesses job postings from the main newsgroups.

The alphabetically organized employer database links to either a CareerMosaic-based page or to the employer's own home page — taking you out of the CareerMosaic site — or to both. It would better serve users if it were cross-referenced by industry segment or location, or both. The Career Resource Center is comprehensive and worth perusing, but skip the Online Job Fairs section unless you want to link to the Virtual Job Fair site, reviewed below.

ESPAN
www.espan.com/

This job matching service site is good for several reasons. But it has one unique feature that makes it worth bookmarking for those days when the only place you want to be is somewhere else: a relocation salary calculator.

Type in your present salary, location and your destination, and find out precisely how much

more or less you'll need to earn to maintain your standard of living. If you get by on $50,000 a year in New York, you'll need only $23,275 to make it in Memphis. It also contains a salary guide for IS pros that breaks the information down by position, region and city.

The real reason to visit this site, however, is to look for jobs. If you register as a member — the service is free — each time you log on, you will see only the jobs that match your user profile and resume. And if you can't log on every day, you can tell the system to E-mail you when matches are found. If you prefer to remain unregistered, this is still an effective place to job hunt. While the service is not IS-specific, it is heavy on IS jobs, and it employs two flexible search engines. Typing "information and systems" garnered about 50 hits, most of which were valid IS positions. A few engineering jobs popped up as well.

Amoco Co., Bank One Corp. and Westinghouse Electric Corp. are among the heavy-hitter employers here. But the majority of employers listed here are consulting firms. To its credit, ESpan doesn't attempt to disguise the fact that it is supported by advertising fees paid by the listed employers.

A Virtual Job Fair
www.vjf.com/

Don't let the name of this site conjure up images of a simulated show floor that features virtual booths you can visit with a point and a click (hey, that would be fun!). The home page boasts some

snazzy outer space graphics. But this site, aimed specifically at high-tech job seekers, serves the same basic function as the other job search sites. It claims to list 15,000 jobs at more than 500 companies, which you can search by keywords, including job title, technology, location or company — but not industry. A search for "programmer" yielded 91 responses.

You can also submit your resume online, simply by clicking on a box. The Resume Center here lets you post your resume either in a public or private database, which is both worthwhile and unique among job search sites. Employers scanning the private database won't see your private information, instead, they E-mail the site, which forwards the message to you. The High-Tech Careers magazine here could use more focus, but scan the archived articles for workplace advice if you have a few extra minutes before moving on to your next

For more surf sites, check out Practical Internet sites for IS, page 86.

Regional Scope: Chicago

Winds of Opportunity

Job offers aplenty blow through the Windy City

What the jobs pay

IS professionals in the Chicago area have seen the following earnings:

Job title	1995 salary	1994 salary	% change
Senior systems analyst	$51,901	$48,204	+7.7
Systems analyst	$42,579	$44,618	−4.6
Manager of information systems	$63,400	$59,748	+6.1
Supervisor of computer operations	$42,039	$40,248	+4.4
Senior programmer/analyst	$46,853	$44,290	+5.5
Programmer/analyst	$39,206	$38,428	+2.0
Programmer	$31,064	$32,084	+3.1
Senior computer operator	$29,764	$26,780	+11.1
Computer operator	$24,136	$22,516	+7.2

Source: Northern Illinois Business Association/Crain's Chicago Business

The high and mighty

The largest employers in Chicago include the following:

Employer	Number of employees
1. U.S. Government	73,506
2. Chicago Public Schools	43,605
3. City of Chicago	40,312
4. Cook County Government	27,849
5. Sears, Roebuck and Co.	26,073
6. Jewel Food Stores	24,386
7. Motorola, Inc.	23,000
8. State of Illinois	22,563
9. Ameritech Corp.	18,356
10. Dominick's Finer Foods, Inc.	18,099

Source: June 1995 figures, Crain's Chicago Business

By William Spain

It is called, among other names, "The City That Works." And with an economy as diversified as the many ethnic groups that call it home, Chicago offers opportunities to skilled information systems professionals in several industries.

From food processing to transportation and financial services to telecommunications, the skills in demand are as varied as the companies that need them. Although virtually all Internet-related skills are in high demand, some of the area's biggest employers continue to rely on mainframe technology.

At United Airlines, "We continue to look for traditional systems personnel — C programmers and Fortran — to work on our large centralized system," says Andy Studdert, senior vice president and chief information officer at UAL Corp. in suburban Elk Grove Village.

"In the last year, we have focused, to a great degree, on our existing mainframe," Studdert says. "We are still continuing to hire mainframe, [database] and [graphical user interface programmers]. Database people are really hot."

But finding the right skill sets "is becoming more of a challenge," Studdert says. "We are having some shortages, but right now, we are generally able to fill the slots with quality people."

Lack of candidates

At catalog retailer Spiegel in Downer's Grove, "We are basically a Cobol, CICS and DB2 shop," says director of systems and programming Richard Steinke. "We are getting into client/server and EDI, [but] finding qualified people in these areas is difficult."

Spiegel's IS staff "needs to have both PC and mainframe skills. We use a lot of programmer/analysts. Our people have to do both the analytical side and the programming," Steinke says.

William Link, director of admissions at the Computer Learning Center in Chicago, watches the local IS job market. He says, "What is hot right now is networking and connectivity skills of all kinds. Novell certification — as engineers, instructors and administrators — is in demand. There is still a demand for AS/400 and Cobol; we have no problem placing our students" in those fields.

Some industries must go begging for talent, Link says. These include "banking. Even though they are downsizing in other areas, they are hiring a lot. Insurance companies need a ton of programmers." Also included on Link's hiring hot list are aerotech, telecommunications, government, legal, financial services and consulting firms.

At advertising agency Leo Burnett, "The No. 1 thing is visionary skills," says CIO Rick Capp. "We need high-level entrepreneurial developers who can break out of that typical [information technology] department box. We also need planners, people who understand the ad business and can strategize and plan the systems of tomorrow."

More specifically, Capp says, Burnett "is always looking for good, qualified programmers, C++, PowerBuilder and good quality Notes developers. ... It seems as though everyone is facing the same business re-engineering obstacles; everyone is trying to migrate to a client/server architecture."

Ken Bergren, managing partner at Andersen Consulting, a management and technology consultancy with a large operation in Chicago, says, "In general, anything related to Unix technology — Oracle, Sybase — are skills that are in very high demand. There is also a growing interest in object-oriented skills. SAP software skills are also highly prized."

Traditional skills not popular

Less in demand, Bergren says, are some of the traditional mainframe skills such as Cobol, DB2 and CICS. "What you will see is that there are a lot of old mainframe applications, but companies are doing maintenance only. And it is rare to see any significant levels of new development," he says.

Internet and intranet, however, "are coming up very rapidly. Java came out of nowhere, and all of a sudden, those types of skills are in very high demand," Bergren says.

And if the job opportunities aren't enough to lure IS people from other regions and keep homegrown ones around, employers also stress quality-of-life issues. While Chicago has virtually all the pleasant attributes of urban life — restaurants, culture, ethnic diversity — found in a New York or Los Angeles, the cost of living is generally far less.

With more than adequate housing stock, it has long been a buyer and/or renter's market. While the winters are legendary for their duration and ferocity — though the "Windy City" sobriquet actually refers to the area's blustery politics — Chicago comes alive during the summer months with a multitude of music, heritage and neighborhood festivals. There are also two baseball teams, one of which is apt to be playing at home almost every day of the season.

Public transportation is adequate, and getting in and out of town is quick and easy. Chicago is the air transportation hub of the nation, with daily direct flights from one of two airports to every major city in the U.S. and many foreign destinations.

"This is the best city in the country," Capp says. "It's a great business town, a good working environment and full of great opportunities." ■

Spain is a freelance writer in Chicago.

http://careers.computerworld.com

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Computer Careers *Midwest*

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CorpTech Career Index

National

March	April	May
4.9%	5.3%	5.2%

Percent change in number of employees by region

Northwest U.S. | Southeast U.S. | Southwest U.S. | Mid-Atlantic | New England | New Jersey & Delaware Valley | Great Lakes | Northern California | Central U.S. | Midwest U.S. | Eastern Lakes | New York Metro | Southern California

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Marketplace

STANDS STRONG
LAN Backup Software

By LESLIE GOFF

For all the terror that data loss can invoke, the LAN backup software market is low on drama. The major vendors, Seagate Software, Inc., Legato Systems, Inc. and Cheyenne Software, Inc., enjoy equal stature, if not equal share. Each company offers solid low-end LAN backup software for Novell, Inc. NetWare and Windows NT. Legato and Cheyenne also have Unix packages. Each vendor has staked a claim in a particular niche.

Arcada Software, Inc., now part of Seagate Software's Storage Management Group, captured the Microsoft Corp. Windows NT market by being first out of the starting gate with its LAN backup product, Backup Exec. Cheyenne's ARCserve dominates the Novell, Inc. NetWare market, but Backup Exec and Seagate's Backup Director — formerly from Palindrome Corp., which Seagate absorbed when it acquired Conner Peripherals, Inc. — are also strong contenders. A clear favorite hasn't emerged yet for Unix, but Legato just inked a deal that could propel its NetWorker package to the front of that segment.

Each of the products is strong in basic LAN backup, restore and central administration functions, but they start to diverge when it comes to disaster recovery, data archival and retrieval, and hierarchical storage management (HSM) capabilities, says John Camp, research director at the Network Systems Management Service at Gartner

Group, Inc. in Stamford, Conn. The vendors are just starting to get into these areas. Cheyenne offers an extra HSM module for NetWare and some built-in disaster recovery features. NetWorker provides archival and retrieval capabilities. Camp says quite a few products now include data archival and retrieval. Of these areas, the most difficult to find is a disaster recovery feature.

Decisions, decisions

Buying decisions come down to how much users anticipate needing these features on a local basis, media formats and client platforms supported, scalability and the degree to which storage management is decentralized. "Because of bandwidth constraints, users want choices over where storage is managed," Camp says.

Despite tight bandwidth, many users are beginning to recentralize storage management policies, if not the hardware itself, notes Dennis Casey, a research analyst at Strategic Research Corp. in Santa Barbara, Calif. "Users aren't going back to the glass house, but there are efforts to centralize at least the management. So a product's ability to manage backup across platforms is important."

Vendors are responding to this trend by trying to provide a more soup-to-nuts distributed storage management solution.

Pricing among the LAN backup software packages is fairly competitive, and analysts don't expect that to change even with the recent consolidation of the market. ■

Goff is a freelance writer in New York.

PRODUCT SAMPLER

Cheyenne Software
Roslyn Heights, N.Y.
(516) 484-5110 or (800) 243-9462
www.cheyenne.com/
ARCserve for NetWare, Version 6.0: $1,895 for enterprise edition (single server, unlimited users); $695 for workgroup edition (single-server, 25-user license)
ARCserve for Windows NT, Version 2.01: $1,395 for enterprise edition; $795 for single-server edition.
ARCserve/Open, Version 2.x: $6,995 for unlimited-client license; $1,995 for 16-client license.

ARCserve provides automatic backup and restore services, disaster recovery, central administration of data management and Simple Network Management Protocol alerts that integrate with network management systems such as Hewlett-Packard Co.'s OpenView and IBM's NetView.

Legato Systems
Palo Alto, Calif.
(415) 812-6000
www.legato.com/
NetWorker for NetWare: $2,100 for enterprise edition (single server, unlimited users); $750 for server edition (single-server, 25-user license).
NetWorker for NT: $1,495 for enterprise edition; $995 for server edition.
NetWorker for Unix: $3,000 for enterprise edition; $2,000 for server edition.
NetWorker is a scalable storage management system that can be configured for backup, recovery, data archiving and file migration in large distributed environments.

Seagate Software, Storage Management Group
Lake Mary, Fla.
(407) 333-7500
www.sssmg.seagate.com/
Backup Exec for NetWare, Version 7.0: $1,395 for enterprise edition; $695 for single-server edition; $495 for single-server, 25-user license.
Backup Exec for Windows NT 6.1: $1,295, for enterprise edition; $695 for single-server edition.
Backup Exec offers automated backup and restore, fault tolerance and concurrent processing on up to 28 devices. Both versions support autoloading and come with an optional Advanced Autoloader Module that will let users segment backup and direct data to user-defined groups.

Is the zing out
of Xilinx? **127**

125

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Finance & Investing

Finance & Investing

the virtual exchange

Who needs Wall Street? Some contend that the Internet will become the place to trade

By Melissa Bane

Andrew Klein, founder of Wit Capital, *aims to cut out the middleman*

I magine sitting at your computer, looking up the current share price of a small start-up in Silicon Valley and ordering 100 shares. An electronic trading system zips the money directly from your online bank account straight to the company. No call to the broker, and, more important, no cut to the broker. That's the dream of a handful of new companies trying to make the Internet the next stock exchange.

The companies differ in their approaches. PerfectData Corp. in Simi Valley, Calif., simply wants to match buyers and sellers over its electronic bulletin board system, PerfectTrade. The trades themselves, however, would take place over the traditional stock exchanges.

Direct IPO Corp. in Marina Del Rey, Calif., wants to help small Internet-related companies offer stock directly to investors via the World Wide Web. Similarly, Wit Capital Corp. in New York hopes to create a system where multiple companies' stocks are traded directly on the 'net.

"We certainly believe the Internet can be the next major trading system," says Andrew Klein, founder of Wit Capital and formerly a securities lawyer. "There's no doubt [that] the technology exists."

Klein set off the race toward online trading in March, when he took his first company, New York-based Spring Street Brewing Co., public on the Web. Klein's innovative plan to cut out the middleman in securities trading set off alarms on Wall Street and at the Securities and Exchange Commission (SEC).

The SEC initially asked Klein to pull down the trading service he created to sell shares of Spring Street Brewing, called Wit-Trade. But after review, the SEC gave Klein the OK to resume operation.

He decided to take his idea to other companies looking to go public on the Internet, founding Wit Capital. Klein says he intends to help small companies raise small amounts of capital. By qualifying as a broker and becoming an equity partner with an investment bank, which has yet to be named, he hopes to offer online trades for free, undercutting traditional, and even discount, brokers. His revenue will come from taking approximately 3% of the shares offered at initial public offerings (IPO), which is significantly less than the 6% average that most investment banks take.

The move has spooked Wall Street, mainly because these trading systems threaten to cut out brokers and commissions entirely. Although several discount brokerages offer online trading at reduced fees, they still charge something. Charles Schwab & Co. (www.eschwab.com/), for example, offers electronic trading for a quarterly fee of $7.50, with a $39 commission for trades up to 1,000 shares and 3 cents extra for each share over 1,000. In contrast, Schwab takes a 10% cut of a traditional trade's overall value.

"I think people are very hostile today toward brokers for a good reason," Klein says. And that reason is brokers have a basic conflict of interest: They offer investment advice but are paid only when their client buys securities. "We aim to remove that problem," he says.

Although the move toward trading on the 'net threatens brokers' traditional price structures, investors will always need some of the services that brokers provide, says Michael Anderson, president and chief operating officer at Accutrade, a discount brokerage that offers online trading.

"If I go directly on the Web, who bears the risk?" he asks. Brokers will be needed to finance margin debts, validate and verify stock certificates, maintain accounting records and send out statements, he explains.

Brokers further argue that setups such as Klein's pose too much of a security risk, not to mention difficult regulation obstacles, due to the open nature of the Internet.

"Somebody's got to guarantee that there's a free and equal flow of information with an online system," says Bert Hochfeld, vice president of Josephthal Lyon & Ross, a financial analysis firm in New York. "Otherwise, you get some investors with an advantage over others and possible insider trading."

Nasdaq spokesman Marc Beauchamp agrees that the Internet poses security concerns regarding fraud, account clearance and overall regulation. He sees the 'net becoming a launching pad for small, illiquid firms that can't afford an IPO on one of the major exchanges rather than a full online trading forum.

Klein argues that with support from the SEC, the Internet could become the perfect trading forum.

"Our goal is to be the biggest and the best," Klein says. "By cutting out the middleman, the Internet is going to completely alter the way markets work."

Pioneering exchanges

DIRECT IPO CORP.
Location: Marina Del Rey, Calif.
Launched: May 1996
Phone: (310) 821-3639
URL: www.directipo.com

PERFECTDATA CORP.
Location: Simi Valley, Calif.
Launched: August 1994
Phone: (310) 358-2340
URL: www.perfectdata.com

WIT CAPITAL CORP.
Location: New York
Launched: April 1996
Phone: (212) 228-5787
URL: www.witcap.com

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Gainers / Losers

PERCENT

Gainers		Losers	
Intelligent Info. Systems	37.5	Weitek (L)	-30.0
Network Computing Devices	30.6	Quantum Corp.	-28.9
Storage Technology(H)	20.1	Quarterdeck Corp.	-27.5
Bachman Info. Systems	18.3	MapInfo Corp.	-27.3
Shiva Corp.(H)	16.6	IPL Systems Inc.	-25.0
PSINet	16.4	Xircom	-24.8
Netrix Corp. (H)	13.7	Microcom Inc.	-24.3
Dataram Corp.	12.8	Retix	-23.3

DOLLAR

Gainers		Losers	
Shiva Corp.(H)	12.00	Business Objects	-9.13
Storage Technology(H)	7.00	Xylan Corp.	-8.25
Systemsoft Corp.(H)	3.38	Seagate Technology	-7.25
NEC America	3.25	US Robotics	-7.06
McAfee Associates(H)	3.25	Brooktrout Technology	-6.75
Compuware Corp.(H)	3.25	Quantum Corp.	-6.50
Microsoft Corp.(H)	2.63	CompUSA Inc.	-6.38
Netscape Comm. Corp.	2.63	Filenet Corp.	-6.00

Industry Almanac

The logical move?

One of the few steadily strong areas in the volatile semiconductor sector has been the market for programmable logic devices (PLD), which are chips that can be customized to perform specific functions. PLD leader, **Xilinx, Inc. (Nasdaq:XLNX)**, has been a favorite among many financial analysts.

But at least one analyst says a looming price war may take some of the zing out of Xilinx.

With revenue of $520 million last year, Xilinx is the largest supplier in the booming PLD market, which amounted to $1.7 billion last year and is growing at 30% a year, says Brett Hodess, managing director at Montgomery Securities in San Francisco. Hodess gives the stock a buy recommendation. He says it could appreciate 30% during the next year and reach $43.

But Drew Peck, a semiconductor analyst at Cowen & Co. in Boston, recently downgraded the stock to neutral after he was bullish on it for years.

Peck says his concern is a possible price war. Xilinx's main competitor, **Altera Corp. (Nasdaq:ALTR)**, is sitting on a lot of inventory and may start cutting prices. Although the PLD market has been robust, most suppliers have found themselves with excess inventory because customers who had feared an inadequate chip supply had double- and triple-ordered. Xilinx has already worked off its excess inventory, he says.
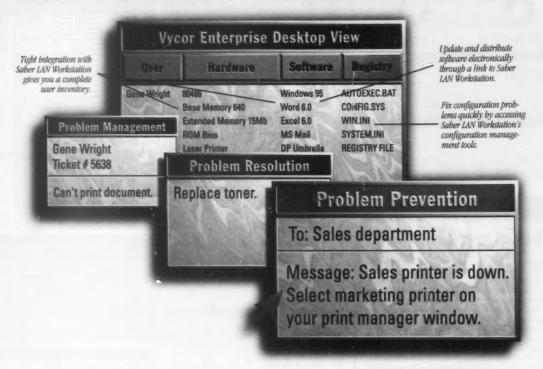
Though price wars stimulate further growth in the market, they will erode Xilinx's gross margins, which have traditionally been high. Xilinx recently reported a record 65.7% gross margin. That erosion is likely to put a damper on the stock price, Peck says. From an investor's perspective, higher revenue growth at the expense of declining margins isn't necessarily good news, he says. — *Tam Harbert*

Bumpy logic

Brett Hodess of Montgomery Securities says Xilinx stock will regain a level of $43 in the next 12 months

2/23	3/29	4/26	5/31	6/11
44⅛	32⅜	37½	34⅝	33¼

Communications and Network Services

Exch	52-Week Range			June 14 3PM	Wk Net Change	Wk Pct Change
COMS	53.63	30.50	3COM Corp.	47.00	-0.63	-1.3
AIT	66.88	42.75	Ameritech Corp.	55.00	-1.00	-1.8
AXE	22.13	15.63	Anixter Int'l.	16.50	-0.63	-3.6
APTS	12.13	2.75	Apertus Tech.	3.81	-0.06	-1.6
T	68.88	50.50	AT&T	62.25	1.25	2.0
ASND	71.25	10.88	Ascend Communications	60.25	-3.44	-5.4
BNYN	14.25	6.00	Banyan Systems Inc.	9.13	0.25	0.9
BAY	50.00	25.38	Bay Networks Inc.	27.38	0.75	0.9
BEL	86.88	43.50	Bell Atlantic Corp.	61.13	-1.38	-2.2
BLS	45.88	30.25	Bellsouth Corp.	38.88	-1.00	-2.5
BRKT	49.00	9.13	Brooktrout Technology	38.50	-6.75	-14.9
CS	87.75	48.63	Cabletron Systems	67.00	0.13	0.2
CSCC	67.38	11.25	Cascade Communications (H)	62.00	-2.25	-3.5
CGRM	25.13	13.00	Centigram Communications	16.50	0.13	0.8
CSCO	57.88	23.00	Cisco Systems Inc.	55.25	-0.50	-0.9
CLIX	13.38	4.50	Compression Labs Inc.	6.50	-1.13	-14.8
CMNT	12.75	4.00	Computer Network Tech.	8.13	0.13	1.6
XCOM	14.50	8.75	CrossComm	10.50	-0.25	-2.3
DIGI	64.00	21.88	OSC Communications	28.81	0.94	3.4
FORE	44.25	12.88	Fore Systems Inc.	34.25	-2.00	-5.5
GDC	21.88	10.00	General Datacomm Inds.	16.88	0.38	2.3
GSX	42.50	28.00	General Signal Networks	38.00	-0.63	-1.6
GTE	49.25	32.75	GTE Corp.	47.38	-0.25	-0.6
LU	39.25	29.75	Lucent Tech.	37.38	-0.25	-0.7
MCIC	31.13	19.38	MCI Communications Corp.	27.75	-0.38	-1.3
MICM	14.38	5.50	Micom Communications Corp.	11.88	0.13	1.1
MNPI	34.50	12.63	Microcom Inc.	13.63	-4.38	-24.3
NETM	34.00	9.38	NetManage Inc.	14.50	-1.75	-10.8
NTRX	10.88	3.63	Netrix Corp. (H)	10.38	1.25	13.7
NCDI	12.00	2.88	Network Computing Devices	5.88	1.38	30.6
NWK	42.00	21.00	Network Equipment Tech.	26.38	-1.63	-5.8
NETG	27.63	11.50	Network General Inc.	26.50	0.13	0.5
NN	74.25	25.00	Newbridge Networks Corp.	62.88	-4.13	-6.2
NT	55.38	31.50	Northern Telecom Ltd. (H)	52.38	-1.38	-2.6
NOVL	21.63	11.38	Novell Inc.	13.81	-0.31	-2.2
NYN	59.25	39.25	Nynex Corp.	46.13	-0.38	-0.8
OCTL	26.25	12.63	Octel Communications Corp.	24.25	0.25	1.0
ODSI	43.25	17.00	Optical Data Systems Inc.	24.00	-0.50	-2.0
PAC	35.25	25.63	Pacific Telesis	33.38	0.00	0.0
PCTL	44.72	20.75	Picturetel Corp.	34.88	-3.75	-9.7
PTON	10.75	4.75	Proteon Inc.	5.50	-0.25	-4.3
RACO	7.88	3.88	Racotek Inc.	6.25	0.13	2.0
RETX	10.88	1.81	Retix	7.00	-2.13	-23.3
SBC	60.25	45.25	SBC Communications	49.25	-0.25	-0.5
SFA	23.38	11.38	Scientific Atlanta Inc.	16.25	-1.75	-9.7
SHVA	84.25	19.13	Shiva Corp. (H)	84.25	12.00	16.6
FON	45.50	29.25	Sprint Corp.	40.38	-1.50	-3.6
SMSC	23.50	14.38	Standard Microsystems Corp.	16.88	0.13	0.7
STRM	57.50	20.50	Stratacom Inc.	54.50	-0.75	-1.4
TBIT	13.88	2.38	Telebit Corp. (H)	12.00	-0.75	-5.9
USRX	105.50	24.25	US Robotics	88.44	-7.06	-7.4
USW	48.38	28.38	US West Inc.	31.38	-1.38	-4.2
XIRC	17.50	8.88	Xircom	11.75	-3.88	-24.8
XYLN	76.00	49.50	Xylan Corp.	49.50	-8.25	-14.3

PC and Workstations

Exch	52-Week Range			June 14 3PM	Wk Net Change	Wk Pct Change
AALR	10.38	5.75	Advanced Logic Research	9.13	-0.25	-2.7
AAPL	50.13	23.00	Apple Computer Inc.	24.13	-0.25	-1.0
ASTA	18.50	4.63	AST Research Inc.	7.63	0.38	5.2
CPQ	56.75	35.88	Compaq Computer Corp.	47.00	-1.38	-2.8
DELL	57.25	23.00	Dell Computer Corp.	51.38	-3.69	-6.7
GATE	41.50	18.00	Gateway 2000 Inc.	39.00	-0.63	-1.6
HWP	115.38	68.50	Hewlett Packard Co.	99.88	-4.25	-4.1
MUEI	29.88	9.00	Micron International Inc.	11.13	-1.38	-7.4
NIPNY	75.13	51.00	NEC America	57.13	3.25	6.0
SGI	45.63	21.13	Silicon Graphics	25.63	0.13	0.5
SUNW	67.13	19.75	Sun Microsystems Inc. (H)	57.50	-5.75	-9.1

Large Systems

Exch	52-Week Range			June 14 3PM	Wk Net Change	Wk Pct Change
AMH	13.50	6.75	Amdahl Corp.	11.13	-0.38	-3.3
DGN	19.13	8.13	Data General Corp.	13.13	0.13	1.0
DEC	76.50	35.13	Digital Equipment Corp.	46.50	0.38	0.8
IBM	128.88	83.13	IBM	103.00	1.63	1.6
MDCD	20.25	3.38	Meridian Data Inc.	15.13	-1.63	-9.7
NETF	7.50	3.88	Netframe	5.38	0.13	2.4
SQNT	25.38	10.13	Sequent Computer Sys.	13.50	0.25	1.9
SEQS	10.00	2.88	Sequoia Systems Inc.	3.38	-0.13	-3.6
SRA	36.13	23.00	Stratus Computer Inc.	31.38	0.63	2.0
TDM	17.50	8.38	Tandem Computers Inc.	11.13	-1.25	-10.1
TRCD	7.56	2.00	TriCord Systems Inc.	5.75	-0.50	-20.7
UIS	11.50	5.50	Unisys Corp.	7.38	-0.38	-4.8

Software

Exch	52-Week Range			June 14 3PM	Wk Net Change	Wk Pct Change
ADBE	74.25	30.00	Adobe Systems Inc.	35.38	0.38	1.1
AMSWA	8.75	3.63	American Software Inc.	5.00	-0.38	-7.0
AFLX	42.50	8.25	Applix Inc.	12.75	-1.75	-5.5
ARSW	82.75	28.25	Arbor Software	59.50	-1.75	-2.9
ADSK	53.00	27.75	Autodesk Inc.	32.50	-2.25	-6.5
BACH	11.88	4.63	Bachman Info. Systems	8.88	1.38	18.3
BGSS	50.00	29.75	BGS Systems Inc.	40.50	-0.50	-1.2
BMCS	67.75	32.50	BMC Software Inc.	64.13	1.38	2.2
BOOL	26.75	19.25	Boole and Babbage	24.88	-0.13	-0.5
BORL	21.25	10.00	Borland Int'l Inc. (L)	10.63	-0.75	-6.6
BOBJY	55.50	15.38	Business Objects	32.75	-9.13	-21.8
CYE	27.88	14.13	Cheyenne Software Inc.	21.25	-0.25	-1.2
COGNF	27.38	8.38	Cognos Inc.	22.25	-2.50	-10.1
CA	82.13	37.25	Computer Associates	67.75	-2.63	-3.7
CVN	15.50	5.13	Computervision Corp.	11.13	0.13	1.1
CPWR	40.25	15.50	Compuware Corp. (H)	40.25	3.00	8.1
CSRE	31.50	12.38	Comshare Inc.	27.25	-0.63	-2.2
COSFF	19.50	8.38	Corel Corp.	12.13	-0.13	-1.0
DWTI	15.75	5.75	Dataware Technologies Inc.	6.75	0.00	0.0
FILE	67.00	33.50	Filenet Corp.	43.00	-6.00	-12.2
DDODF	8.25	3.56	4th Dimension	7.19	-0.19	-2.5
FTPS	40.63	8.13	FTP Software Inc.	9.50	-0.88	-8.4
GSOF	26.00	7.00	Group I Software	9.25	-1.00	-9.8
GPTAE	10.50	3.25	Gupta	4.56	-0.44	-8.9
HUM	28.88	17.00	Hummingbird Comm. Ltd.	18.50	-0.50	-2.6
HYSW	28.38	9.75	Hyperion Software Corp.	13.25	-0.75	-5.4
IRKC	18.63	10.00	Information Resources	12.88	0.25	2.0
IFMX	36.75	16.88	Informix Corp.	22.63	-0.75	-3.2
INGR	20.13	10.88	Intergraph Corp.	11.63	-1.44	-11.0
LEAF	12.63	6.13	Interleaf Inc.	7.56	-0.19	-2.4
ISLI	26.25	8.75	Intersolv Inc.	10.13	-1.25	-11.0
INTU	89.25	33.38	Intuit Inc.	53.75	2.50	4.9
LGWX	22.25	10.88	Logic Works	13.50	-1.75	-8.5
MAPS	37.75	10.00	Mapinfo Corp.	12.00	-4.50	-27.3
MATH	9.25	3.38	MathSoft	7.00	-0.13	-1.8
MCAF	50.75	12.38	McAfee Associates (H)	50.75	3.25	6.8
MENT	22.88	10.88	Mentor Graphics	17.13	0.00	0.0
MIFGY	21.25	8.25	Micro Focus	12.63	-0.88	-6.5
MGXI	18.63	6.19	Micrografx Inc.	6.88	-1.38	-16.7
MSFT	125.38	79.88	Microsoft Corp. (H)	123.25	2.63	2.2
ORCL	36.75	23.38	Oracle Corp.	33.75	0.25	0.7
PMTC	49.50	22.13	Parametric Technology (H)	44.75	-1.88	-4.0
PARQ	14.63	6.63	ParcPlace Systems Inc.	11.63	0.75	6.9
PSFT	73.00	25.38	Peoplesoft (H)	71.25	2.00	2.9

Exch	52-Week Range			June 14 3PM	Wk Net Change	Wk Pct Change
PTEC	20.38	9.00	Phoenix Technologies	17.00	-2.63	-13.4
PSQL	16.88	3.13	Platinum Software	9.31	-1.44	-13.4
PLAT	26.00	11.25	Platinum Technology	16.00	-0.75	-4.5
PRGS	38.00	14.63	Progress Software Corp.	15.13	-0.63	-4.0
RNBO	26.75	16.88	Rainbow Technologies Inc.	18.75	-3.25	-14.8
REDB	61.00	29.50	Red Brick Systems Inc.	36.00	0.00	0.0
ROSS	8.13	2.19	Ross Systems	6.00	-0.50	-7.7
SCOC	12.13	5.50	SCO Inc.	7.13	-0.63	-8.1
SDTI	109.00	17.63	Security Dynamics Tech. (H)	92.25	-3.00	-3.1
SKEY	51.75	13.38	Softkey International Inc.	25.38	-0.38	-1.5
SPCO	5.13	2.00	Software Publishing Corp.	2.88	0.25	9.5
SQAX	39.75	16.00	SQA Inc.	33.00	-1.25	-3.6
SOTA	19.75	6.63	State of the Art (H)	18.63	-0.75	-3.9
SSW	81.38	33.50	Sterling Software Inc.	78.38	1.13	1.5
SDRC	37.38	10.38	Struct. Dynamics Research	23.50	-0.50	-2.1
SYBS	39.75	21.25	Sybase Inc.	23.88	1.25	5.5
SYMC	33.25	9.88	Symantec Corp.	13.50	-1.00	-6.9
SNPS	46.75	23.00	Synopsys	41.25	-2.75	-6.3
SSAX	30.63	12.63	System Software Assoc.	17.50	1.38	8.5
SYSF	58.25	8.75	Systemsoft Corp. (H)	50.88	3.38	7.1
TRUV	10.13	4.50	Truevision Corp.	7.25	-0.13	-1.7
VIEW	17.50	9.63	Viewlogic Systems	14.88	-0.88	-5.6
VMRK	21.50	5.75	VMark Software Inc.	11.63	0.13	1.1
WALK	12.75	4.75	Walker Interactive Systems	11.00	-0.38	-3.3
WALL	23.75	13.00	Wall Data Inc.	22.75	0.75	3.4
WANG	26.13	13.88	Wang Laboratories Inc.	20.63	-1.06	-4.9

Internet

Exch	52-Week Range			June 14 3PM	Wk Net Change	Wk Pct Change
AMER	71.00	18.00	America On-Line	45.19	-3.44	-7.1
BBN	48.75	17.88	BBN Corp.	23.13	-1.50	-6.1
CSRV	35.50	22.50	Compuserve Corp.	25.25	1.38	1.8
LCOS	29.25	13.63	Lycos Inc.	13.63	-3.13	-18.7
NETC	91.50	19.22	Netcom On-Line	34.25	1.00	3.0
NSCP	87.00	22.88	Netscape Comm. Corp.	63.38	2.63	4.3
PSIX	29.00	6.75	PSINet	16.00	2.25	16.4
QDEK	39.50	8.88	Quarterdeck Corp.	9.88	-3.75	-27.5
EIGIT	39.25	22.75	Raptor Systems	26.13	-3.75	-12.6
SCUR	64.50	19.00	Secure Computing Corp.	29.75	-4.50	-13.1
SPYG	61.00	13.25	Spyglass Inc.	23.63	-1.75	-6.9
UUNT	98.75	22.75	UUNET Tech.	64.00	2.00	3.2
YHOO	43.00	24.50	Yahoo! Inc.	25.25	-1.25	-4.7

Semiconductors

Exch	52-Week Range			June 14 3PM	Wk Net Change	Wk Pct Change
AMD	35.88	14.50	Advanced Micro Devices	16.13	-1.25	-7.2
ADI	30.13	17.50	Analog Devices Inc.	26.88	-0.25	-0.9
CHPS	15.88	7.88	Chips and Technologies	10.00	-0.75	-7.0
CRUS	61.13	17.00	Cirrus Logic	18.50	-1.50	-7.5
CY	27.75	10.00	Cypress Semiconductor Corp.	13.13	-0.63	-4.5
CYRX	49.75	18.25	Cyrix	26.25	-4.88	-15.7
INTC	78.38	49.81	Intel Corp.	73.50	-1.75	-2.3
LSI	62.50	22.50	LSI Logic Corp.	27.38	-1.38	-4.8
LSCC	43.00	26.38	Lattice Semiconductor	35.00	0.75	2.2
MCRL	32.50	12.25	Micrel Semiconductor Inc.	15.00	-0.50	-3.2
MU	94.75	17.50	Micron Technology	29.88	-0.75	-2.4
MOT	82.50	44.75	Motorola Inc.	64.38	-1.38	-2.1
NSM	33.63	13.50	National Semiconductor	15.50	-0.25	-1.6
TXN	83.75	42.75	Texas Instruments	53.13	-0.63	-1.2
VLSI	39.13	10.75	VLSI Technology	14.63	-1.38	-8.6
WWTK	6.88	0.75	Weitek (L)	0.88	-0.38	-30.0
WDC	29.00	14.38	Western Digital Corp.	23.50	-0.63	-2.6
XLNX	55.50	23.25	Xilinx	33.31	0.19	0.6
ZLG	54.13	28.50	Zilog Inc.	30.38	-3.38	-10.0

Peripherals and Subsystems

Exch	52-Week Range			June 14 3PM	Wk Net Change	Wk Pct Change
APCC	25.88	7.88	American Power Conversion	11.44	-0.94	-7.6
ADPT	61.50	31.25	Adaptec Inc.	50.38	-2.75	-5.2
CBEX	13.13	5.00	Cambex Corp.	11.00	-0.38	-5.8
CGM	7.25	3.06	Cognitronics Corp.	5.13	0.06	1.2
CREAF	14.13	6.25	Creative Technologies Inc.	6.75	-0.25	-3.6
RACE	12.88	3.63	Data Race Inc.	5.63	-0.63	-10.0
DTM	9.38	4.13	Dataram Corp.	6.63	0.75	12.8
EMC	27.38	13.00	EMC Corp.	20.13	-2.25	-11.1
EMLX	28.50	6.38	Emulex Corp.	17.75	-1.75	-9.0
ESCC	29.00	14.25	Evans and Sutherland	23.75	-1.00	-4.0
EXBT	22.75	10.00	Exabyte	16.38	-1.88	-10.3
IHSLF	4.75	1.50	Intelligent Info. Systems	2.75	0.75	37.5
IOMG	55.13	2.50	Iomega Corp.	38.25	0.88	2.3
IPLS	8.25	2.50	IPL Systems Inc.	4.50	-1.50	-25.0
KMAG	37.50	21.38	Komag Inc.	29.00	-4.13	-12.5
MTSI	36.25	14.25	Micro Touch Systems Inc.	19.88	-1.38	-6.5
PEAK	34.75	17.25	Peak Technology Group	25.50	-1.25	-4.7
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PTNX	29.25	9.75	Printronix Inc. (H)	16.25	-1.75	-9.7
AQM	6.75	3.25	QMS Inc.	6.00	0.00	0.0
QNTM	28.50	15.88	Quantum Corp.	16.00	-6.50	-28.9
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SEG	67.75	36.63	Seagate Technology	47.38	-7.25	-13.3
STK	44.13	21.25	Storage Technology (H)	41.75	7.00	20.1
STLC	8.75	1.25	Streamlogic Corp.	5.31	-0.31	-5.6
TEK	61.88	29.75	Tektronix Inc.	36.38	-1.13	-3.0
XRX	54.75	36.50	Xerox Corp. (H)	52.50	-1.88	-3.4

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ANLY	43.75	25.50	Analysts Int'l	41.25	-1.75	-4.1
AUD	43.38	30.25	Auto Data Processing	37.38	-0.88	-2.3
CATP	82.63	31.00	Cambridge Tech. Partners	70.75	0.75	1.1
CEN	54.88	33.00	Ceridian Corp.	50.63	-2.50	-4.7
CDO	28.63	14.00	Comdisco Inc.	26.88	-0.38	-1.4
CHRZ	54.00	9.75	Computer Horizons	44.75	-2.50	-5.3
CSC	80.75	51.75	Computer Sciences	75.50	-0.75	-1.0
TSK	31.88	10.75	Computer Task Group	28.38	1.13	4.1
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MICA	16.25	7.25	Microage Inc.	14.50	0.06	0.4
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PMS	55.50	42.63	Policy Management Sys. (H)	54.88	0.50	0.9
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	Extended Memory 15Mb	Excel 6.0	WIN.INI
	ROM Bios	MS Mail	SYSTEM.INI
	Laser Printer	DP Umbrella	REGISTRY FILE

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Second crash brings down Mass. registry

By Michael Goldberg

In the past month, two of the ancients' elements — fire and ice — have crashed the computers at the Massachusetts Registry of Motor Vehicles.

A Storage Technology Corp. Iceberg disk array failure last month kept the registry off-line for 15 hours. The failure stalled lines of drivers waiting for licenses and prevented police from verifying motorists' registrations.

Last week, an overheated channel board in an EMC Corp. Symmetrix 5500 storage subsystem caused enough smoke in a data center in Chelsea, Mass., to activate a gas-spewing fire suppression system and shut down power in the building.

Pair of problems

The 180G-byte subsystem, owned by the state Office of Management Information Systems, is right next to the registry's mainframe. So when the power went out, the registry sustained its second unusually public system failure in five weeks.

"The irony of the situation is stunning," said David Lewis, deputy registrar of motor vehicles and the agency's IS chief. "We came down hard. It wasn't very graceful."

Power was out for seven hours, beginning at 8:30 a.m. As a result, the registry asked customers to return the next day, and the agency kept its 39 branch offices open late for them.

Smoking rare

Thomas B. Lahive, an analyst at International Data Corp. in Framingham, Mass., said it is unusual to hear about smoking circuitry in a storage subsystem. He said state officials may need to examine the new data center building for power surges and other problems.

No data was lost or corrupted in the crash, said Ralph Ragucci, data center director at the Massachusetts Information Technology Center. EMC technicians took a few hours to isolate the channel board and replace and test the storage system before the system was back up.

A StorageTek spokesman said no information was available yet from engineers who are examining the registry's failed Iceberg array, which was shipped back to Louisville, Colo., last month.

NT 4.0 crash warning issued

tors and Microsoft executives.

Microsoft supports thousands of drivers, but there are almost as many small, third-party vendors that churn out video drivers they never bother to get tested and Microsoft-certified, said Mark Minasi, president of Tech-Teach International, Inc. a systems integrator in Arlington, Va.

Interviews last week with at least eight users of the NT 4.0 Beta 2 release indicate this version delivers performance boosts of 100% to 150% over NT 3.51 in downloading graphics files and running multimedia applications.

To achieve those gains and endow Windows NT with speed comparable to Windows 95, Microsoft moved the Windows NT user interface functions from the "User mode" to the "Kernel mode."

These two modes will let NT access hardware device drivers and memory addresses, which are necessary to perform any computing task.

NT also employs the User and Kernel modes to allocate memory as needed.

A Kernel mode program can access any memory in the system. By contrast, the User mode program can access only the memory that has been allocated by the Kernel mode.

"So if a User mode program like Microsoft Word blows up, it can only crash itself. But under the new NT 4.0 structure, things like video and printer drivers are now in Kernel mode," Minasi explained. "If they crash, they can potentially crash both the server and the workstation."

Microsoft made the change to speed up the core NT 4.0 operating system.

Hard lessons

One information systems manager at a large East Coast engineering firm, who requested anonymity, found out the hard way what the wrong video driver can do to NT.

The shop had been running the 4.0 beta in a pilot network for about 20 of its engineers when the server crashed.

"These were all power users [and] unbeknownst to me, somebody decided to install a cheap, no-name video driver so he could get snappy performance on the 32-bit games that come with NT Workstation," the manager said.

"We now have a standing, no-exceptions rule: Microsoft-approved hardware only," he emphasized.

For users such as J. Briscoe Stephens, the advanced scientific information systems coordinator at NASA's Marshall Space Flight Center in Huntsville, Ala., the benefits of the Beta 2 release outweigh potential problems.

"Moving the user interface functions into the underlying Windows NT operating system puts more responsibility on the user. People should be smart enough to not cut corners by buying untested devices [to] save a few dollars," Stephens said.

Advice from those who do Windows

Users and systems integrators offer the following advice to get the highest speed and reliability from Windows NT 4.0:

- **Use only** the video and printer drivers that are on Microsoft's approved hardware list.
- **Keep** your servers as clean as possible. That means installing name-brand adapters and drivers that come with a warranty.
- **Whenever** possible, use the standard VGA driver that comes bundled with Windows NT 4.0. Users and system integrators say it is one of the best debugged drivers in the industry.
- **Always** test the drivers on a pilot network — for at least one or two weeks and preferably for 30 days — before you buy any driver in volume.
- **Limit** and keep close track of how many 32-bit Windows 4.0 video games your users are playing.

Mostly stable

Users have been generally pleased with the power and stability of the Windows NT 4.0 Beta 2 release, but a few bugs have cropped up.

Jim Snively, a systems consultant at Sun Oil Co. Refining Marketing in Philadelphia, said he can't get the Dynamic Host Configuration Protocol (DHCP) to work.

DHCP lets businesses — such as a car rental agency — automatically assign TCP/IP addresses as needed. This is much quicker and more efficient than manually assigning permanent TCP/IP addresses.

Snively and other users recently posted messages regarding the glitch on Microsoft's CompuServe forums.

"They've told us they are now working to correct the problem, but we don't have a date yet," Snively said.

— Laura DiDio

In disk-array: IBM allies with StorageTek

buys arrays from EMC Corp. and Hitachi Data Systems Corp.

But confusion may arise in the short term as IBM trains its sales force to sell what until now have been "enemy" products. IBM also needs to better explain how it will position and price the StorageTek arrays alongside Ramac, users said. StorageTek users, in particular, said they are concerned.

Setting positions

IBM last week said it will sell Ramac as a high-availability array for storing mission-critical data. It will pitch Iceberg as a less-expensive product, said Mike Harrison, director of storage marketing programs at IBM. Kodiak targets high-performance applications.

But Ramac and Iceberg overlap each other much more than IBM is letting on, said Dick Fernandez, assistant vice president of computing services at Insurance Services Office, Inc. Insurance Services is a clearinghouse for property and casualty insurance data in Pearl River, N.Y., that has 450G bytes of Iceberg storage.

"I want to get past the hype and get to the real-world stuff," said Fernandez, who plans to meet with IBM officials later this month. He said he "may want to insist that [he] stay with StorageTek" for maintenance, even on Iceberg purchases that come from IBM.

Other StorageTek customers also voiced concern about service and support plans and whether IBM will honor pricing deals that StorageTek verbally agreed to for future purchases and upgrades.

As part of the deal, IBM will fund StorageTek's future development of Iceberg and Kodiak, which are being renamed as Ramac products.

Mainframe storage

IBM's development of a final Ramac upgrade, which is due in the first quarter next year, will also continue, as will its next-generation Seastar project, Harrison said.

James Vanderslice, general manager of IBM's storage division in San Jose, Calif., acknowledged that its current one-size-fits-all Ramac strategy wasn't good enough for many customers.

Ramac is too pricey for some users and doesn't pack the performance offered by other arrays, such as Kodiak, he conceded.

Ramac has also been hurt by its reliance on IBM's aging 3990 Model 6 disk controller.

The stand-alone 3990, a full-size box in its own right, can manage only 180G bytes of data, far less than the newer controllers that rivals integrate into their arrays.

Having to use up to four 3990s to manage the same amount of storage that EMC can handle with a single controller makes it "very difficult for Ramac to compete," Bell Sygma's Perry said.

Choppy waters

Meanwhile, Seastar has slipped from the original target date of mid-1996 to late 1997 or even 1998 for a version that supports big iron.

"If the Seastar stuff were right around the corner, I don't think IBM would be doing this. But they need to keep their customers," said Luther Perry, information services director for the County of Santa Cruz in California.

Seastar will connect multiple disk and tape controllers in a fault-tolerant ring that can support mainframes and other servers. The all-new architecture has been IBM's hope for stealing technical leadership back from EMC and other vendors, although analysts said the long delay makes that a tougher task.

The Back Page

Software lags hardware's fourfold leap

Charles Babcock

Hardware is about to get four times faster, but PC software isn't keeping up. As Intel groups four Pentium Pro microprocessors on systems boards, the applications to run on them lag behind. Far behind.

PC software makers are still thinking serially, while hardware is about to enter the parallel age. A flock of Intel's multiprocessor machines is about to come off the production lines.

Why not a parallel Word or QuattroPro that takes advantage of four-way processing capability? Or a parallel data analysis system for the data warehouse? Database management systems effectively exploit parallel hardware.

Many would say parallel PC software isn't necessary yet. Compaq, IBM, Digital and Hewlett-Packard are producing Pentium Pro servers, not desktops. But I don't think four-way desktops are far off. The financial services industry deals with multiple data streams and time-sensitive decision-making. What appears to be a $20,000 server to the rest of us seems like a great candidate for a desktop to Wall Street.

How could your PC software tap in to this four-way power? In one sense, PCs that run Windows NT and OS/2 could run more tasks — four applications could run at the same time — with these symmetrical multiprocessing operating systems. But even NT and OS/2 can't get an application to work faster, no matter how much hardware is thrown at them. PC software is single-minded. It runs on a single CPU no matter what, and PC software makers are too busy bulking up on features to recognize the dawn of a parallel age.

Although the major PC software tools ignore the trend toward parallelism, one small company has addressed the field.

The Portland Group in Wilsonville, Ore., supplies High-Performance Fortran, which is used in parallel on Cray Research supercomputers. It also offers C and C++ parallel compilers on the In-

tel x86 series. But Doug Miles, director of marketing at The Portland Group, says the firm doesn't market them because no one is interested. The Portland Group offers profiler tools that can analyze how to parallelize a program, browsers and debuggers for parallel systems and compilers.

A very low percentage of The Portland Group's business is with PC software makers, Miles says, but "with the Pentium Pro, that's going to change. These [Intel] boards give us the opportunity to push high-end, parallel technology down to the desktop," he says. But you don't see Borland, IBM or Microsoft racing to beat the competition, do you?

What remains a long way off is

a body of programming talent that can put parallel concepts in desktop software. Most programmers aren't prepared to think in parallel terms. They are taught math and programming in serial terms. They learn to attack logical problems through a sequence of steps.

Parallel thinking requires subdividing a problem into sections whose tasks can be attacked by a set of CPUs all at once.

Some people think parallel compilers eventually will automatically rearrange software for us, but I think they'll have little impact. They optimize the parts of programs that are most obviously parallelized. But they don't work magic. Given a long series of serial tasks, the parallel compiler won't help much.

Instead, human intelligence must reorganize the problem to maximize the use of multiple processors. But getting today's programmer to think in parallel terms is "mind-bogglingly hard to

do," says Chris Willard, a high-performance computing analyst at International Data Corp. in Framingham, Mass., and a former parallel programmer at the NASA Ames Research Center in Mountain View, Calif.

Parallel programs were developed by astrophysicists, organic chemists and molecular biologists, whose research depended on them. Few commercial firms knew how to generate parallel systems, and fewer were interested in doing so for small markets.

That will change. Intel's four-way systems board has become a readily available component. There was no mass market for parallel programs before, but low-cost, four-way hardware will change that.

Initially, we may have to rely on smaller firms to supply the parallel market. But the day isn't far off before the mainstream companies will have to confront the need for parallel or stand by as today's unknowns give rise to a new generation of software giants.

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The Meta View

I don't think four-way desktops are far off.

This is your brain on Windows

The never-ending Internet newsgroup debate about whether PCs or Macintoshes rule has been bringing a legitimate online support group for victims of brainwashing and torture to its knees with message after message on weighty topics such as "Why Windows 95 doesn't suck." Microsoft haters apparently decided that alt.mindcontrol would be a receptive site for warnings about the "evil empire" in Redmond, Wash. But an alt.mindcontrol regular last week sent out a plea that the message flow be stopped, saying the PC/Mac war accounted for 90% of the newsgroup's postings. That was making alt.mindcontrol "almost useless," he added.

'net start-up lures Silicon Valley suits

Executives at perfectly stable computer companies continue to leave in droves for promising baby Internet start-ups. Come July 1, one such young'un, Active Technologies, will introduce itself and the former Sun and Adobe suits who founded it, according to a source close to the Mountain View, Calif., firm. Active will offer software to tie World Wide Web applications in to relational databases. The product reportedly will reflect its founders' roots: It's written in Java.

'I'll be baaack . . . with another name'

Warner Bros. studios last week got out an eraser for its upcoming Arnold Schwarzenegger summer flick, also called *Eraser*. Chip maker Cyrix filed suit because the villainous corporation in the film was named Cyrex. Warner Bros. is in the process of changing the name, which

appears on a number of hats, shirts and buildings in the film.

IBM frames FRAD

IBM soon will begin shipping a product called a frame-relay access device (FRAD), which will enable users to save on wide-area costs by squeezing many types of data over frame-relay links. The 2218 Nways Model 12X was designed to provide an entry-level device for tying far-flung branch offices to corporate data centers. The FRAD will ship on June 28 at just under $2,000.

The 5th Wave by Rich Tennant

Making out on the Internet

Make Systems in Mountain View, Calif., is preparing to upgrade its performance evaluation and simulation tools for wide-area networks in two weeks. Version 2.5 of NetMaker XA will map traffic to and from the Internet to help administrators fully baseline WAN activity.

Westell deals first modem card for ADSL

Westell Technologies will likely become the first vendor to ship a PC modem card that will enable users to take advantage of Asymmetric Digital Subscriber Line (ADSL) technology. ADSL transmits data at 1.544M bit/sec. over regular telephone lines. The Oswego, Ill., firm will ship the $500 FlexCap PC card modem for ISA-bus PCs by summer's end.

DEC to ship 500-MHz chip

Digital will release a 500-MHz version of its EV56 21164 Alpha chip. Expected the week of July 1, the chip will incorporate new visual instructions into the existing architecture and will be aimed mainly at corporate multimedia and videoconferencing markets.

Les Alberthal, chairman and CEO of Electronic Data Systems, last week launched EDS' first day of independence from General Motors by ringing the opening trade bell at the New York Stock Exchange. But he wasn't sporting one of the T-shirts that he had passed out to celebrants at EDS headquarters the previous Friday, when GM shareholders approved the spin-off. Those shirts stated, "Split Happens." Whatever happens, you can contact Computerworld with your news tips or happenings. You can reach news editor Patricia Keefe at patricia_keefe@cw.com or (508) 820-8183.